

1st Proof

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Eldbotle; the archaeology and environmental history of a medieval rural settlement in East Lothian

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with contributions from Ruby Ceron-Carrasco, Alejandra Gutiérrez,
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ABSTRACT

Excavations on the Archerfield Estate, East Lothian, have uncovered evidence, in the form of buildings and enclosures, for the lost village of Eldbotle, a settlement which was in use from the 5th century AD to the 18th century, but at its peak during the 13th and 14th centuries. Excavated rural settlements of this date are rare in Scotland so this has been used as an opportunity to explore the impact of national political and environmental events, and their social and economic repercussions, on the development and evolution of a small agricultural community like Eldbotle. Thus, by weaving multiple strands of evidence together, the settlement at Eldbotle has been brought to life, despite the limited nature of the archaeological record.

INTRODUCTION

Excavations on the Archerfield Estate, East Lothian (illus 1), by Headland Archaeology in 2003 (Morrison et al 2008) and by AOC Archaeology in 2006, have uncovered the remains of the village of Eldbotle, a settlement known from documentary and cartographic references but lost from view since the 18th century. The excavations have found evidence, in the form of buildings and enclosures, for an agricultural settlement on the site from the 5th century AD to the 18th century, after which the locus was abandoned. This paper presents the evidence from the AOC Archaeology excavations at Eldbotle, but draws on the earlier excavations to present as complete a history of the settlement as the evidence allows.

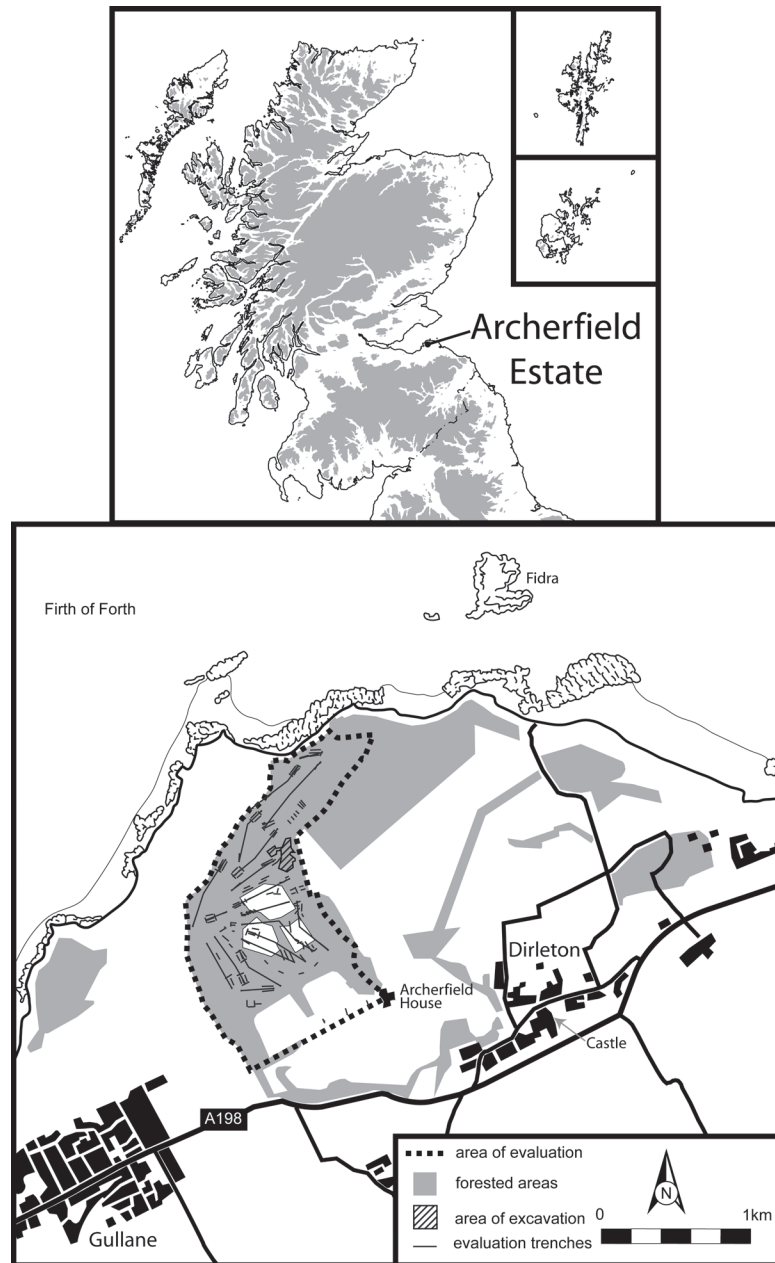
The settlement was at its most extensive during the 13th and 14th centuries, a period during which there were numerous extreme weather

events (Oram forthcoming), the impacts of which would have been sorely felt by an agricultural community. Added to the burdens of famine and dearth caused by these events would also have been those of the epidemic and epizootic diseases that spread across Britain and Europe during this period, and the more immediate impacts of war, when English troops ravaged East Lothian in 1298 and the early decades of the 14th century (Oram forthcoming). The historic context for the development, contraction and final abandonment of the settlement is explored, and the archaeological and historical evidence are drawn together to produce a more comprehensive narrative for Eldbotle.

A BRIEF HISTORY OF ELDBOTLE

Although the first historical reference to Eldbotle occurs in the 12th century (see below),

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ILLUS 1 Site location, showing the extent of archaeological evaluations on the Archerfield Estate

the placename itself implies the existence of a settlement of much greater antiquity (Proudfoot & Aliaga-Kelly 1997). The name is in the Northumbrian dialect of Old English, *Eld-bōtl*, suggesting that the placename dates from the Northumbrian settlement of the Lothians – which probably began in the late 6th century. The use of *bōtl* as a generic placename is known to have ceased well before the end of the 9th century, meaning that the name could have been coined any time between *c* 600 and *c* 900. However, *Eld-bōtl* means ‘old dwelling-place’, which implies that there was an even earlier settlement there. This might have been an earlier Northumbrian settlement, or it could have been a British settlement. The archaeological evidence from sites such as Doon Hill and Dunbar suggests that existing British settlements may have been peacefully taken over by the Northumbrian incomers, and it is possible that the same thing happened at Eldbotle (Hope-Taylor 1980; Perry 2000: 312–16).

The Eldbotle estate first appears in the historical record in the reign of King David I (1124–53), who issued two charters there (Barrow 1999: no 140, no 141). Eldbotle appears again in the early 1160s, when David’s successor, Malcolm IV, also issued two charters whilst there (Barrow 1960: no 194; 1980: App A, no 1). The presence of successive kings at Eldbotle implies that there was an estate centre there in the first half of the 12th century, possibly the successor of the old Northumbrian *bōtl* on the site.

In the latter half of the 12th century, the estate was granted to John de Vaux, although the de Vaux family was not named specifically as holders of the land until the early 13th century when they granted the canons of Dryburgh Abbey a substantial piece of land, centred on Eldbotle itself (Barrow 1980: App A, no 1; Bannatyne Club 1847: nos 23, 25–34). The charter was very detailed and it is clear that Eldbotle was already a well-established multiple tenancy township with clearly defined territorial limits, communal rights and seigniorial burdens.

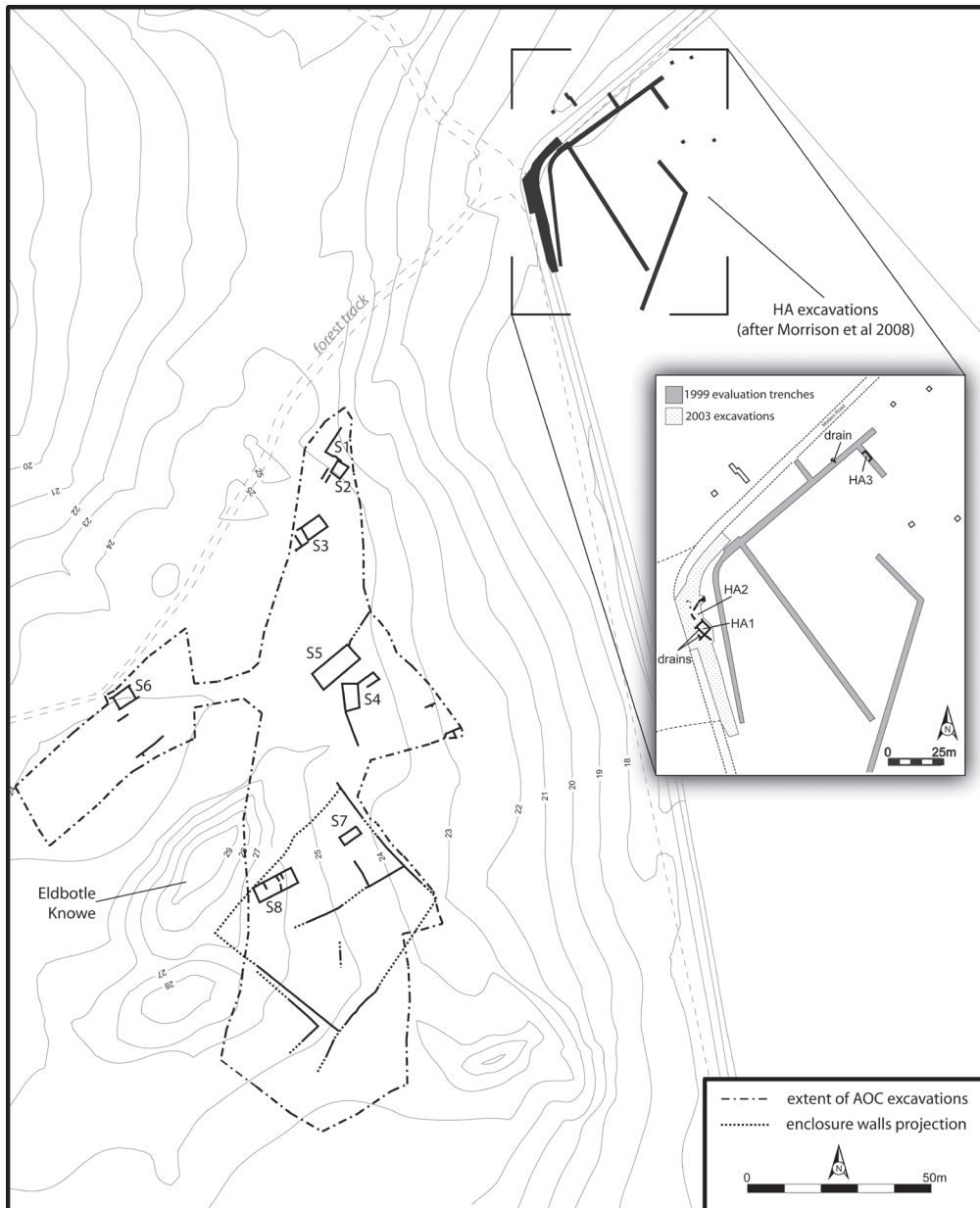
The de Vaux family also granted portions of the township to the Knights Templar (Maidment 1830: 19; Cowan et al 1983: 212), and there were other secular tenants (Bain 1884: no 823, 201), but the family retained possession of the majority of the land until the early 1340s, when the male line died out. During the late Middle Ages, the land passed via the female line to the Haliburtons and thence to the Ruthvens who, in 1606, forfeited their Dirleton estate, of which Eldbotle was a part, to the Erskines (Thomson 1984: no 1510). The land then had a number of different owners before being sold in 1663 to Sir John Nisbet, who started building work on Archerfield House.

Eldbotle itself is identified on several of the earliest maps, such as Blaeu (1654) and Adair (1736), marked by a generic symbol for a settlement, so one might assume that there was a settlement there until at least the early 18th century. However, there is no longer any indication of a settlement on Roy’s *c* 1750 map, although the name is still shown along with what appears to be two distinct buildings (illus 23). By the beginning of the 19th century, the settlement name is all that is marked on Forrest’s 1802 map and soon after this, the name disappears completely (eg, on John Ainslie’s 1821 map).

ARCHAEOLOGICAL BACKGROUND

PREVIOUS INVESTIGATIONS

The remains of the settlement of Eldbotle were first located during evaluation works carried out by Headland Archaeology (HA) in 1999, ahead of a proposed golf course development (illus 2) (Morrison et al 2008). The evaluation revealed the existence of stratified deposits up to 1.4m in depth and covering an area of 1.3ha, within which were stone structures, cut features and finds of medieval pottery, all buried below wind-blown sand. The national significance of these deposits was recognised in 2002 by the application of Scheduled Ancient Monument



ILLUS 2 General site plan showing extent of AOC investigations and location of Headland Archaeology (HA) excavations; inset shows details of the HA excavations

status to an area of 18,984 sqm around them. The scheduling notice acknowledged the potential of the area, describing it as 'a rare example of an intact medieval rural settlement', and noted its potential to make a major contribution to our understanding of medieval rural settlement and economy.

In 2003, Scheduled Monument Consent was granted to allow the excavation of a trench in the north-western corner of the scheduled area, where the adjacent road was being widened (Morrison et al 2008). Although this excavation was limited to a trench 120m in length by 6.5m wide (illus 2), evidence for three phases of human activity was found. The earliest phase, radiocarbon-dated to the 5th–7th centuries, consisted of curvilinear features of uncertain function. The second phase, dated by radiocarbon assay and artefacts, spanned the 9th–11th centuries and consisted of intercutting slots and gullies, which probably represent the construction trenches for palisades or timber buildings. The third phase was characterised by the appearance of rectangular, stone-built buildings and a rich artefact assemblage. Radiocarbon dates and a large assemblage of Scottish White Gritty Ware (SWGW) indicated a 13th–14th-century date for this phase.

THE RECENT INVESTIGATIONS

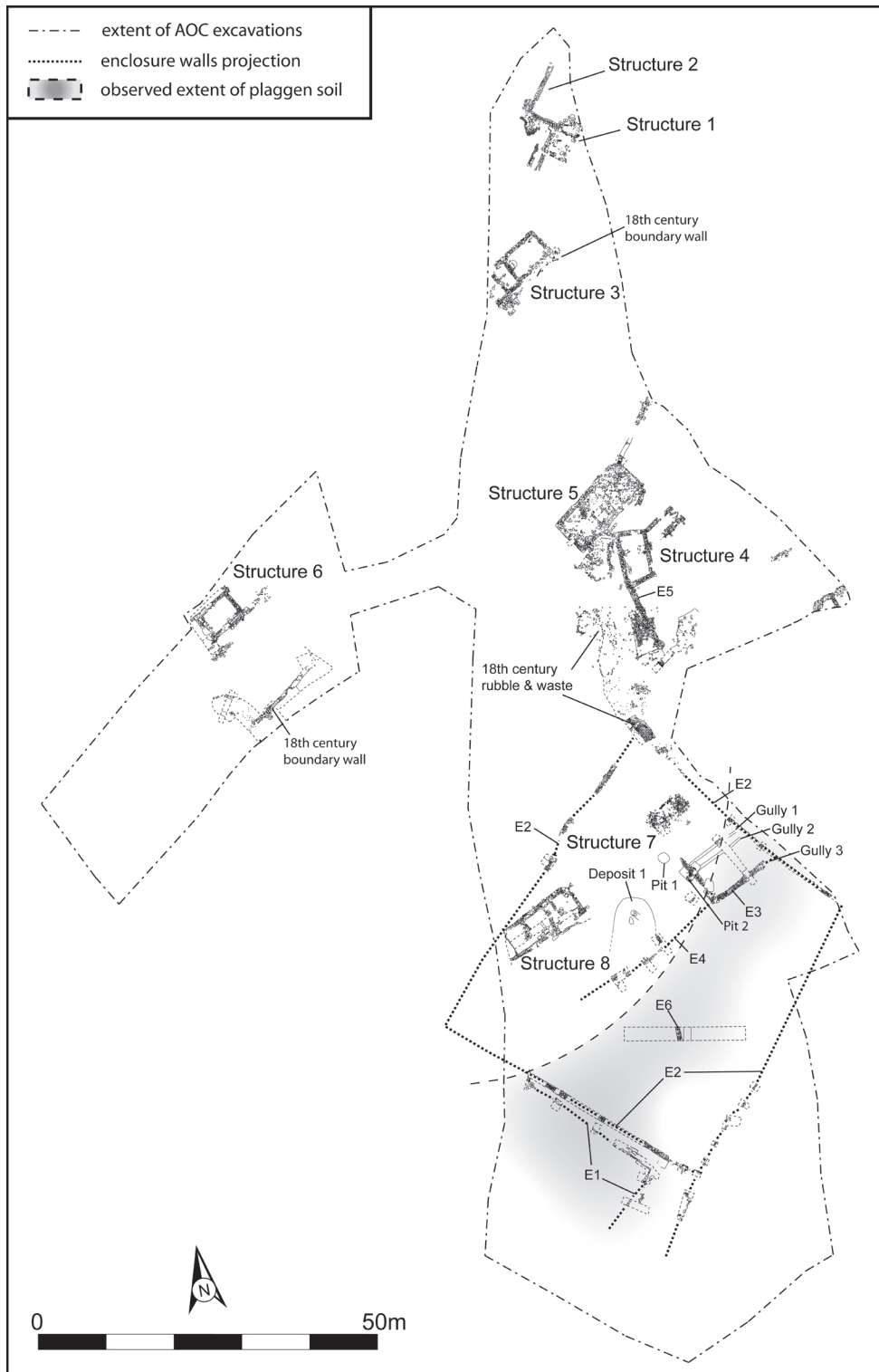
The excavations by AOC Archaeology Group (illus 2) were the final stage of a programme of archaeological works designed to mitigate a planning condition imposed on the construction of a new golf course on the Archerfield Estate. The previous works had included a walkover survey, a designed landscape survey and an archaeological evaluation which identified the extensive structural remains within the vicinity of the 17th hole of the golf course (illus 1). The significance of these remains was immediately recognised and it was therefore agreed that they should be preserved in situ and protected by means of landscaping and the creation of a vertical buffer zone. However, the nature

and extent of the remains needed to be fully determined so that they could be effectively protected from any future development. A programme of limited excavation was therefore designed to evaluate the nature and extent of the buildings without jeopardising the integrity of the in situ archaeology. In order to achieve this, the overlying topsoil was stripped, exposing the footprints of the various structures which were then subjected to investigation by means of small slots or test pits. Apparent sterile areas between the footprints were tested by means of small trenches or pits. A consequence of this approach is that, while the plan of the structural remains is probably quite comprehensive, the full structural and chronological complexity of the site may not have been revealed; in particular, there may be earlier structures and deposits which were not encountered at all.

SITE LOCATION

The excavation area (centred on NGR NT 4990 8500) lies approximately 1km north of Archerfield House (illus 1). Structural remains were found to the west, north and east of Eldbotle Knowe, a large conical hill which rises to 29m OD, and so an irregular-shaped area of approximately 7,800sqm, which encompassed the 17th fairway of the golf course, was investigated further (illus 2). The structural remains lay approximately 100m to the south-west of those investigated by HA and outside the scheduled area. Although separated by the remains of recent woodland plantation, it is clear from their construction and alignment that the buildings uncovered by HA are an integral part of the same settlement that was subsequently uncovered by AOC. No archaeological features were found in evaluation trenches to the north of the forest track, and the area to the east of the fairway was left untouched.

A commercial conifer woodland plantation had existed in this part of the proposed golf course and prior to the evaluation the trees were felled to ground level. The stumps and root



ILLUS 3 Detailed plan of area investigated showing the observed extent of the plaggen soil

systems were then removed under archaeological supervision. A motocross track had also been mechanically excavated across the site.

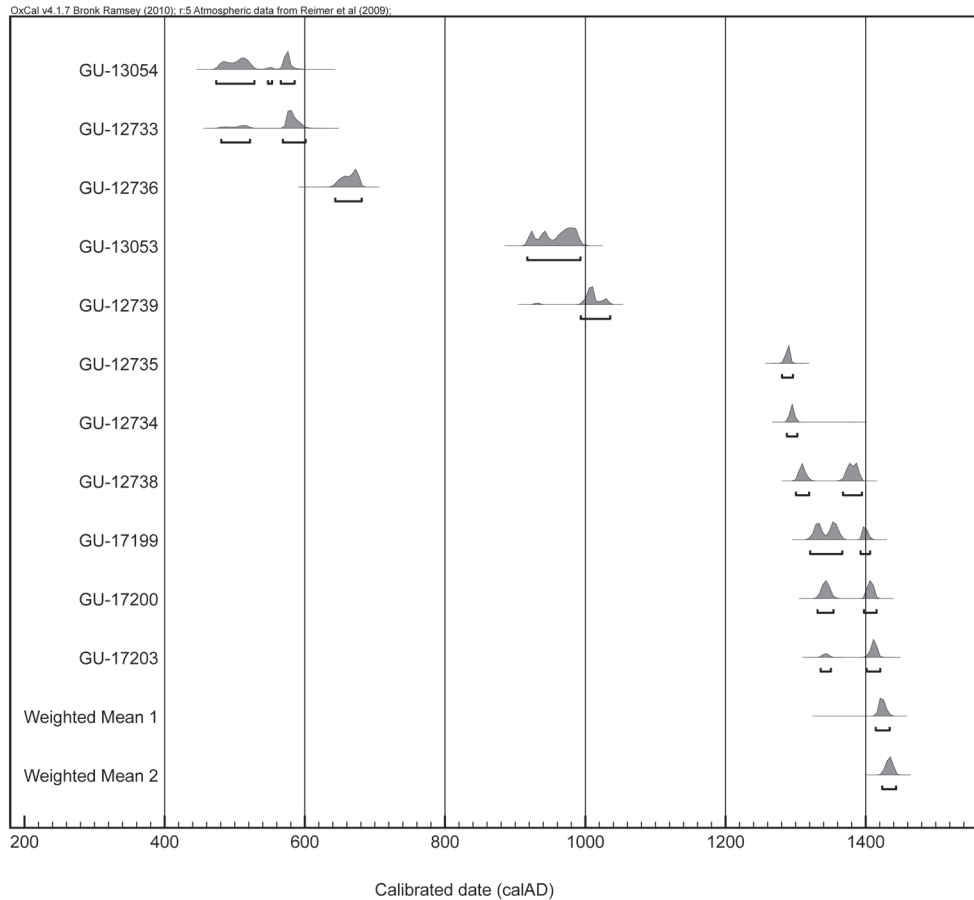
The Soil Survey of Scotland (1976) describes the soils of the site as Class 4 soils, which are those that have moderately severe limitations that restrict the choice of crops and/or require very careful management. Immediately adjoining the site to the north is an area of undulating wooded dunes, described as Class 5 with severe limitations that restrict its use to pasture and forestry. However, to the south of the site the soils are Class 1 and have very minor or no physical limitations to use.

These soils are derived from wind-blown sands and raised beach deposits of the Fraserburgh Association, which in turn overlie boulder clay and morainic drift. The B horizon encountered on the site consisted of a very stony but compact sandy clay and is referred to below as the subsoil.

THE EXCAVATED EVIDENCE

CHRONOLOGICAL SEQUENCE

The AOC excavation identified eight stone-built structures in varying degrees of preservation,



ILLUS 4 The radiocarbon dates (graph produced using OxCal v4 1.7 Bronk Ramsey 2010; r:5 Atmospheric data from Reimer et al 2009)

TABLE 1
Radiocarbon dates. *Multiple dates on marine shell and cereal grain from these contexts were undertaken as part of a study into the marine radiocarbon reservoir effect in the North Sea (Russell et al 2010). The dates from each context were determined to be statistically indistinguishable at 95% confidence from each other and therefore, a weighted mean date was calculated and is used here.

Lab code	Material	Context	Uncal	$\delta^{13}\text{C}\%$	Calibrated dates	
					1-sigma	2-sigma
Headland Archaeology excavations						
GU-12733	Birch charcoal	24	1535 ± 35	-25.3	AD 430–540	AD 400–570
GU-12734	Barley	153	695 ± 35	-24.0	AD 1270–1310	AD 1260–1330
GU-12735	Barley	176	720 ± 35	-23.8	AD 1264–1299	AD 1220–1310
GU-12736	Cattle bone	24	1425 ± 35	-21.8	AD 600–660	AD 550–670
GU-12738	Birch charcoal	65	645 ± 35	-26.5	AD 1295–1390	AD 1280–1400
GU-12739	Birch charcoal	90	1065 ± 35	-25.1	AD 900–1020	AD 890–1030
GU-13053	Pig bone	58	1115 ± 40	-21.1	AD 890–980	AD 810–1020
GU-13054	Cattle bone	36	1550 ± 40	-21.6	AD 430–560	AD 420–600
AOC Archaeology excavations						
Weighted Mean 1 (of 7 dates*)	Winkle, limpet, barley and oat	ST8/ML 4	520 ± 43	na	AD 1413–1423	AD 1310–1449 AD 1409–1429
GU-17199	Barley	ST1/Midden 2	595 ± 30	-27.8	AD 1350–1360 (53.4%) AD 1385–1405 (14.8%)	AD 1290–1410
GU-17200	Barley	ST1/Midden 2	570 ± 30	-27.8	AD 1315–1350 (40.5%) AD 1390–1415 (27.7%)	AD 1300–1370 (57.5%) AD 1380–1430 (37.9%)
GU-17203	Mammal bone	ST3/levelling deposit	555 ± 30	-21.5	AD 1320–1345 (28.8%) AD 1390–1420 (39.4%)	AD 1300–1360 (28.8%) AD 1380–1440 (50.5%)
Weighted Mean 2 (of 16 dates*)	Winkle, limpet, barley and oat	ST6/Midden 2	492 ± 22	na	AD 1423–1435	AD 1410–1445 AD 1418–1439

midden deposits, a number of possible field boundaries (illus 3), and a plaggen soil – a man-made deposit created by continuous manuring. While the keyhole excavation strategy, together with the scattered nature of the settlement, meant that the stratigraphic relationships between some of the structures could not be fully explored, it has been possible, with the support of radiocarbon dates and artefact typologies, to develop a chronological sequence for the settlement.

Evidence for five phases of activity was found during the AOC excavations. However, as was made clear above, the evidence from the earlier HA excavations forms an integral part of the settlement's history and is thus included in the chronological sequence presented below. These excavations provided the only evidence for the two earliest known phases of activity in the settlement. Evidence for a third phase was found in both the AOC and HA excavations while evidence for a further four phases were found only in the AOC excavations.

It is clear that during Phase 3 certain buildings were abandoned whilst settlement continued elsewhere in the area. Consequently, Phase 3 has been split into two sub-phases; Phase 3a covers a period from the 13th century to the end of the 14th century and includes the period of peak habitation of the site, while Phase 3b covers the late 14th–15th century, when the abandonment of certain structures may signal the beginning of the decline of the settlement. The radiocarbon dates for Phase 3 reflect the continuous nature of occupation of the site during this phase (illus 4; Table 1) and highlight the fact that there is no distinct boundary between the two sub-phases. The later phases of activity on the settlement are not clearly defined either, partly because of the restrictions placed on any intrusive excavation and partly because it was difficult to disentangle the different episodes of wind-blown sand which afflicted the area. There are

also structures that may be ascribed different positions within the chronology of the site. Nonetheless, seven phases of activity have been defined:

- Phase 1: 5th–7th centuries
- Phase 2: 9th–early 11th centuries
- Phase 3a: 13th–late 14th centuries
- Phase 3b: Late 14th–15th centuries
- Phase 4: Marked by structures and deposits that are later than the Phase 3 plaggen soil. Dating evidence consists of probable residual 14th–15th-century pottery
- Phase 5: Episode of wind-blown sand which buries Phase 4. Not dated but finds of residual 14th–15th-century pottery recovered
- Phase 6: Marked by structures which overlie the wind-blown sand of Phase 5. Undated but possibly as late as 18th century, on basis of cartographic evidence
- Phase 7: Abandonment of settlement. Possibly end of 18th century, on basis of cartographic evidence and 18th- and 19th-century pottery in dumped deposits.

The evidence is presented below by phase. The evidence from the HA excavations is briefly summarised so that as complete a chronological sequence as possible can be presented.

ARTEFACTS AND ECOFACTS

The artefact assemblage recovered during the excavation consisted primarily of ceramics and metalwork. Assemblages of animal and fish bone, marine shell and charred macroplant material were also recovered. The individual assemblages are briefly summarised here with more detailed references, where relevant, in the

text below. The full specialist reports can be consulted in the site archive, deposited at the NMS.

Ceramics

Derek Hall and George Haggarty

The assemblage is small, consisting of only 446 sherds of pottery from 52 contexts. Scottish White Gritty Ware (SWGW) (Cats 1–8) made up the bulk (64%) of the assemblage, and included a minimum vessel count of 211 jugs and 27 jars. This group is primarily made up of thicker walled vessels that would appear to date to the 14th and 15th centuries (Jones et al 2006), although some earlier material is present from contexts in the southern part of the site (illus 000, 1–3). This type of pottery was produced at Colstoun, near Haddington, although some of the pottery from Eldbotle has a reddish-pink tinge, indicative of a high iron content, something not common in material from Colstoun, and may indicate another, as yet undiscovered, production site for this pottery (Brooks 1980; Hall 2007).

Imported medieval ceramic types consist of a single sherd of 13th–14th-century Yorkshire Type Ware (not illustrated), and a single sherd of North French Whiteware (illus 000, 11), dated to the late 12th/early 13th century. Later imports include of a single sherd of German Stoneware (illus 000, 9) from a large salt glazed Frechen stoneware Bartmann jug, of 17th century or later date, and a sherd of North Italian Marbled Polychrome ware (illus 000, 10). The latter came from a costrel, or flask, of a type generally thought to date to 1600–50 (Hurst et al 1986: 33 and 37, figs 15, 32 and 33), and is only the third to be found in a Scottish context, the other examples coming from Fetternear, Aberdeenshire, and Calton Road, Edinburgh (Haggarty forthcoming).

The remainder of the assemblage consisted of brown glazed earthenwares which date to the 18th and 19th centuries.

Metalwork

Alejandra Gutiérrez

A modest assemblage of 37 metal finds was recovered from the excavations. These objects represent domestic life and agricultural activities and include a few personal dress accessories. Most of the finds are ferrous, of which 18 are nails; only four copper alloy objects were also found. Although some of the objects are difficult to date in themselves and have a long currency in the medieval and post-medieval periods, most of the artefacts were found in sealed medieval contexts of 14th–15th century date and derived from the occupation of the site; a handful date to the late 18th century, but these have been imported to the site as debris clearance from elsewhere, possibly from Archerfield House. Among this later material there is a knife handle (illus 19; SF 150), folding knife (illus 19; SF 23), suspension chain (illus 20; SF 148) and strap hinge (illus 21; SF 149), as well as nails.

The four copper alloy objects are dress accessories of medieval date and include typical objects well known from domestic occupation: buckles, pins and wire fasteners (illus 18). Except for the large, circular buckle (SF 52), all of them are small and delicate finds, which may represent casual losses.

Among the medieval domestic items there is a handle support for a wooden vessel (illus 20; SF 45) and a knife blade (illus 19; SF 42). The structural ironwork is exclusively nails. These are of medium size, with square section, tapering shank and round head; they are all probably timber nails (ie illus 21; SF 165). Studs of thin shanks and prominent heads would have been used on doors and windows as decorative items. A complete example (SF 173) indicates the thickness of the wood at 46mm. Clench nails (SF 55) are usually associated with ship building, but they were also employed in buildings, for example, for re-used wood and in double-thickness timber construction such as door-making (Dulley 1967: 228; Addyman & Goodall 1979: 90).

With the exception of an awl (illus 22; SF 170) and a couple of unidentified items (ie illus 21; SF 44), the rest of the objects relate to agricultural activities, including a fragmented horseshoe (illus 22; SF 111), a possible weedhook or pruning hook (illus 21; SF 171) and two or three sickles, one of them complete except for the wooden handle (SF 24, 46 and 174). These are all from medieval 14th–15th-century contexts.

As a whole, the assemblage is small but sheds a little light on the main aspects of medieval rural life. In this respect it is a welcome addition to the corpus of finds from Scottish sites, where the investigation of urban sites and more elite contexts, such as castles and monasteries, have tended to dominate, as they have in the rest of Britain.

Animal bone

Jackaline Robertson

An assemblage of 890 animal bones were recovered by hand and a further 222 fragments were collected during the sample processing. This assemblage came from 42 contexts. The main domesticates present were sheep, cow, pig and horse. Dog, cat and rabbit were also present, although the rabbit bone came mainly from the topsoil.

Sheep were the dominant species in the assemblage, with an MNI of 11. Epiphyseal fusion gives a wide range of age at death, which suggests that this species had an important, if mixed, role in the economy of this site. Fusion rates indicate that a large percentage of these animals were culled before the age of 18 months, while the remaining sheep were slaughtered between the ages of two to six years. This is confirmed by tooth wear that shows that one sheep died between the ages of two to six months, with a further two sheep slaughtered aged between six and twelve months. The next age group culled were usually aged between two to four years. Epiphyseal fusion and tooth wear indicate that few sheep survived to four

years old and there is no evidence to suggest any animal reached an advanced age.

The culling pattern suggests that milk and meat production was the main objective, with wool a secondary consideration. The young lambs were usually kept alive long enough to stimulate and prolong milk production and were subsequently slaughtered before the start of winter. The older animals were kept alive to produce milk and for breeding. The adult animals appear to have been slaughtered as they obtained their maximum size or just after. There is evidence of butchery marks made by a heavy blade on several bones.

At least six cows were present. Epiphyseal fusion indicates that this was a meat economy, although it is also logical to assume that secondary products, including milk, would also have been exploited. There is no evidence that young animals were slaughtered at the site and epiphyseal fusion demonstrates that the youngest animal died just before the age of two. The majority of the animals appear to have been slaughtered after the age of three, once they had reached their maximum size. This is confirmed by tooth wear that highlights the absence of both calves and senile individuals. There is a distinct lack of age-related pathologies commonly associated with older individuals. However, there was excess bone growth along the glenoid cavity of one scapula, and this could indicate that this was a draught animal.

There is evidence of butchery marks on several bones and these appear to have been made by a variety of tools. These include marks made by a heavy chopping blade, which was probably a machete, and there is also evidence of skinning marks more consistent with a smaller, lighter knife. The wide range of elements present suggests that these animals were probably living on or in near proximity to this site.

At least four horses were present and epiphyseal fusion and tooth wear indicate that with one exception, these animals had all

reached an advanced age. The only exception is a horse which appears to have perished prior to 18 months. Epiphyseal fusion indicates that the remaining individuals were at least three years old, while tooth wear suggests that they were much older. There is also evidence of age-related pathologies; in particular, one metatarsal displays all the symptoms indicative of arthritis. These include bone growth, porosity and eburnation. Other elements also displayed signs of excess bone growth and porosity that normally only occur in animals of an advanced age.

At least two pigs were present. Epiphyseal fusion rates suggest that at least one of these animals died before eight months, while the presence of a third molar, which normally erupts between the ages of 17 to 22 months, indicates that the second animal survived for slightly longer. There is no wear to this third molar and the pig was probably slaughtered shortly after the tooth had erupted.

As over 60% of the assemblage was unidentifiable as to species (although the bulk of these bones could be attributed to large mammals), it is probably wise not to speculate too much about the economic importance of each species. The evidence indicates that meat and milk production was the main objectives of the economy, possibly with wool as a secondary consideration. The horses were the only domesticates which lived to an old age, presumably being used for transport and as draught animals, along with one of the cows.

Macroplant remains

Jackaline Robertson

Samples from 28 contexts were assessed and of those, only 14 contained macroplant remains in significant quantities. These were all contexts in the Phase 3a Structures 1, 3, 6, 7 and 8. Some 5,007 plant remains and fragments were recovered from these contexts. The cultivated cereals present were barley (*Hordeum* sp), bread wheat (*Triticum aestivum* L) and oats

(*Avena sativa* L). Barley was dominant, accounting for 50% of the identified remains, while bread wheat accounted for 30% and oats for 20%. Barley is dominant in all contexts except for three, but the variation in cereal composition across the various contexts does not appear to be significant. Only very small volumes of cereal chaff, straw and weed seeds such as fat hen (*Chenopodium album*) were recovered, indicating that the cereals had been fully processed. Other cultivated crops include peas (*Vicia Pisum sativum* L) and lentils (*Lens esculenta*),

Some of the wild taxa present are edible and may have been gathered deliberately rather than as accidental inclusions unintentionally harvested along with the cultivated crops. These include wild radish (*Raphanus raphanistrum* L) and St John's Wort (*Hypericum perforatum* L), both known for their medicinal properties, as well as elder (*Sambucus nigra* L), which was used to make cordials and wine. The St John's Wort fruits were found in only two contexts in Structure 8, which suggests deliberate harvesting.

Three seaweed pods were found in the sequence of occupation deposits within Structure 8; the seaweed was probably brought onto the site to be used as manure.

Marine resources

Ruby Ceron-Carrasco

Apart from a few large robust skeletal elements recovered by hand during the excavation, the bulk of the fish bones were recovered during sample processing. Some 485 fragments were recovered from 28 contexts. The assemblage is dominated by fish of the cod family; haddock (*Melanogrammus aeglefinus*), cod (*Gadus morhua*), whiting (*Merlangius merlangus*) and pollack (*Pollachius pollachius*) are the most significant species present in the assemblage. Herring (*Clupea harengus*), plaice (*Pleuronectes platessa*), mackerel (*Scomber scombrus*) and thornback ray (*Raja clavata*)

were also present. The only freshwater fish present was some unidentified Salmonidae vertebrae, from either salmon or trout. Apart from the latter, most of these species could have been caught by line from the shore or from boats fishing inshore.

A few of the fish bones had been burnt at high temperatures, possibly as a result of rubbish disposal.

Some 589 identifiable fragments of marine shell, as well as unquantified amounts of unidentified fragments, were recovered from 32 contexts. Periwinkle (*Littorina littorea*) and limpet (*Patella vulgata*) were the most abundant marine molluscs present; both these species have quite robust shells and survive well in archaeological deposits. Other species present include oyster (*Ostrea edulis*), cockle (*Cerasoderma edule*), mussel (*Mytilus edulis*), razor shell (*Ensis ensis*), Icelandic cyprine (*Artica islandica*), prickly cockle (*Acanthocardia echinata*), whelk (*Buccinum undatum*), dog whelk (*Nucella lapillus*), thin telling (*Tellina tenuis*) and top shell (*Gibbula cineraria*).

Most of these species are edible and were used for both food and for fishing bait, and could have been easily gathered along the shores near the settlement. The top shell, thin telling and dog whelk are not edible and may have been accidentally gathered along with the other species present.

PHASE 1

This phase consisted of cut features such as slots or gullies. Although pottery dateable to the 12th–14th centuries was recovered from these features, it was considered to be intrusive and dating was based on the radiocarbon dating of organic material from the fills. Three of the dates span the period cal AD 400–670 (GU-12733, 12736 and 13054: Table 1). A fourth date spanned a period of between cal AD 1030–1230 (GU-12732) but, like the pottery,

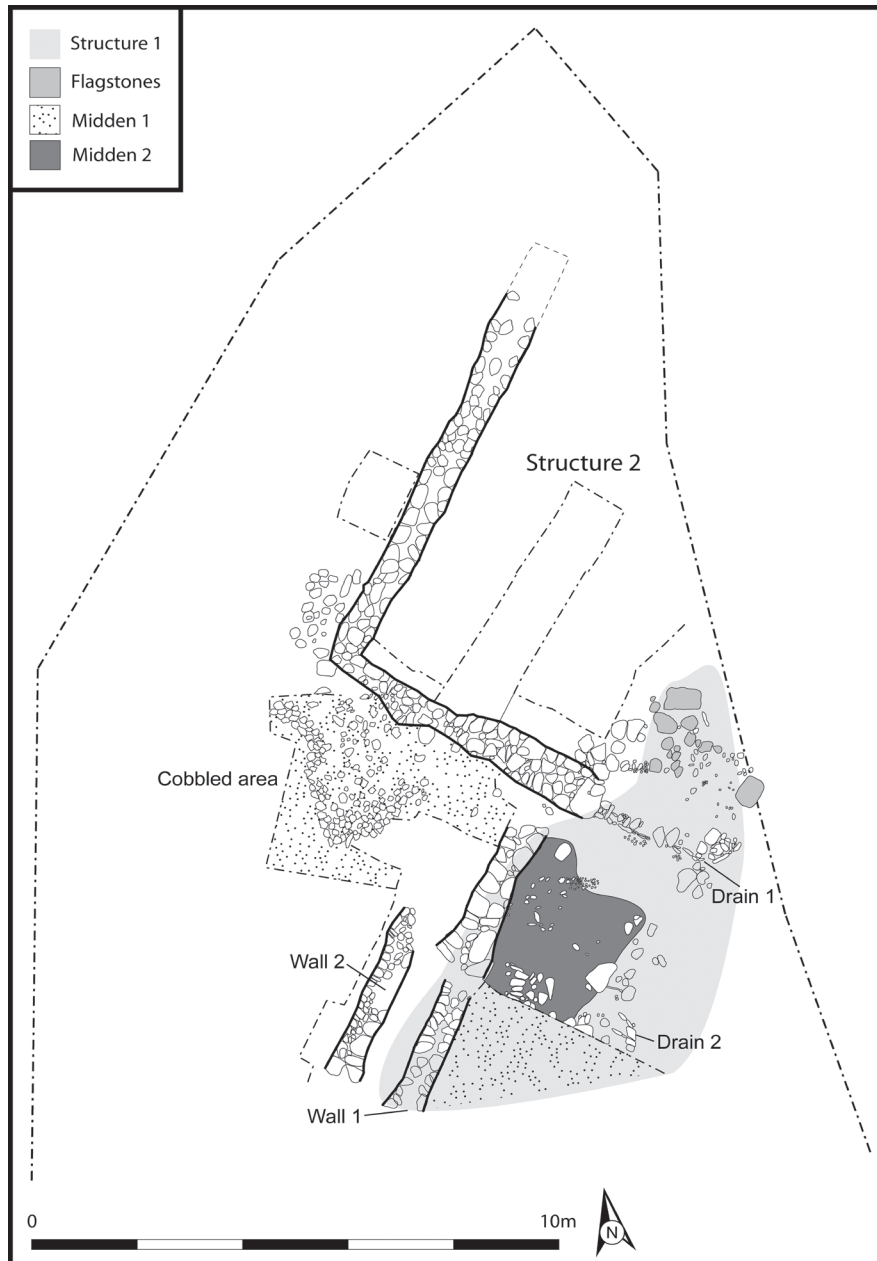
is believed to be intrusive. Interpretation of these features is difficult as their full extents are unknown. This phase was only identified during the HA excavations (Morrison et al 2008: 27).

PHASE 2

This phase also consisted of cut features. These were steep-sided and their fills were often stone-rich, prompting the interpretation that the features were the truncated remains of construction trenches for palisades or timber buildings, with at least one sub-rectangular structure represented. The features all appeared to be aligned north-east/south-west. As with Phase 1, a small amount of 12th–14th-century pottery was found, but again was deemed to be intrusive. Dating was based on two radiocarbon dates from charcoal and bone, which returned dates spanning the period cal AD 810–1030 (GU-12739 and GU-13053: Table 1). These dates were supported by the presence of chronologically diagnostic finds including a bone comb and a pin beater. Again, this phase was only identified during the HA excavations (Morrison et al 2008: 27–30).

PHASE 3

This phase encompasses the peak of activity in the settlement as represented by the excavated remains. It is during this period that the first stone structures appear in both the HA and AOC excavations. All the buildings within this phase are also aligned north-east/south-west, thus continuing the alignment displayed by the building in the previous phase. It is also in this phase that the first enclosures are encountered in the form of stone built walls, that is, E1. A plaggen soil, encountered on the southern and eastern edges of the excavated areas, is thought to reflect the agricultural activity associated with this phase.



ILLUS 5 Structures 1 and 2

The vast majority of datable artefacts were also recovered from this phase. The pottery finds consisted of Scottish White Gritty Wares (SWGW). However, two periods of pottery production have been identified. Most of the finds from the HA excavations were dated to the 13th and 14th centuries, whilst the majority of the pottery recovered from the AOC excavations was a later, 14th- and 15th-century style.

PHASE 3A

Included in this phase are the remains of at least two, and possibly three, stone structures found during the HA excavations. A further six structures and some lengths of walling found during the AOC excavations have also been ascribed to this phase.

STRUCTURE HA1

This is Structure 1 in the HA report, renamed HA1 here to distinguish it from AOC Structure 1 (illus 2).

The complete ground plan of this, the best preserved structure of the HA investigations, was only partially excavated, revealing a single-roomed building with walls surviving to at least 1m in height and buried below the collapsed remains of a turf superstructure. This building had two opposed entrances, both slightly off-centre (the northern one being infilled at some later date) with large edge-set stones forming raised thresholds. A pivot stone was set on the inside of the eastern doorway, allowing for an inward opening door. Two flag-covered stone drains were also found within this building. No hearth settings were found but a deposit of compact burnt material is believed to be the rakings from a hearth located in the unexcavated portion of the building. Radiocarbon dates from deposits believed to have derived from domestic activity (Table 1: GU-12735) and from a pit (Table 1: GU-12734)

within the building suggest that this building was in use during the 13th century. However, there is some evidence to suggest that the building cannot have been occupied before the 14th century. A knife, which typologically is unlikely to be earlier than the 14th century, was recovered from a pit pre-dating the building (Cowgill et al 1987: 25). Either the dated charcoal from the occupation deposits is residual or the chronology of the knife type is much longer than previously thought. Perhaps the building was built and occupied towards the end of the 13th century, immediately after the digging of the pit.

A further radiocarbon date obtained from charcoal from overlying deposits suggests that the building had gone out of use by the end of the 14th century (Table 1: GU-12738). This date is supported by the find of an early 15th-century belt buckle amongst domestic waste dumped in the ruins (Morrison et al 2008: 30–2).

STRUCTURE 1 (ILLUS 5)

Approximately 100m south-west of the HA excavations were the remains of another similar stone-built building, Structure 1. The remains of this building consisted of a single wall (Wall 1) which formed the western side, two drains which lay at right angles to the wall, and an area of flagstones to the north of Drain 1. A second wall (Wall 2) lay 2m to the north-west of, and parallel to Wall 1 but its relationship to Structure 1 is unclear.

Wall 1 was built from clay-bonded field stone with a rubble core and had survived to a height of 0.13m. This wall was built directly onto the subsoil and was buried by a deposit of dark brown sand which contained large amounts of late SWGW (illus 16; no 6) and is interpreted as a midden deposit (illus 5; Midden 1). No construction trench was found for this wall. Abutting the southern side of Wall 1 was a deposit of dark-brown sandy silt, 0.05m deep, which also lay directly over the subsoil (illus 5; Midden 2). This deposit contained numerous

artefacts, fishbone and burnt cereal grains, and had enhanced phosphate levels suggesting that it too was a midden deposit.

The artefacts from Midden 2 included five fragments of late SWGW, two copper alloy buckles (illus 18; SF 52 and SF 167) and two nail fragments. One of the buckles, SF 52, was of a typical medieval form, but SF 167 is of a type not common amongst finds from medieval contexts. Those which are known, for example, from London and Norwich, tend to have a more rectangular frame with parallel sides (Egan & Pritchard 1991; Margeson 1993).

Significant amounts of fish bone were also recovered; including cod, haddock, whiting, pollock, mackerel and herring. Burnt cereal grains from this deposit consisted mainly of barley (*Hordeum* sp) with some bread/club wheat (*Triticum* cf 'aestivo-compactum') and a single grain of oat (*Avena sativa* L).

Two drains cut the subsoil (illus 5). Both the drains were lined with stone along the base and sides, and Drain 1 also had the remains of a slabbed stone covering. A pivot stone was found just above the drain, no longer in situ. These drains were aligned north-west/south-east, presumably across the width of the building, thus using the natural slope of the ground to take waste away. Late SWGW was recovered from the fill of Drain 1 together with a length of corroded wire (not illus; SF 169). To the north-east of Drain 1 was an area of large flat stones which may be the remnants of a flagstone floor which once covered the room.

Barley grains from Midden 2 produced radiocarbon dates of cal AD 1300–cal AD 1430 (GU-17200) and cal AD 1290–cal AD 1410 (GU-17199), while the overlying midden deposit, Midden 1, contained large quantities of pottery of 14th–15th-century date. The dating evidence from these post-abandonment deposits suggests that the structure could have been abandoned sometime early in the 14th century.

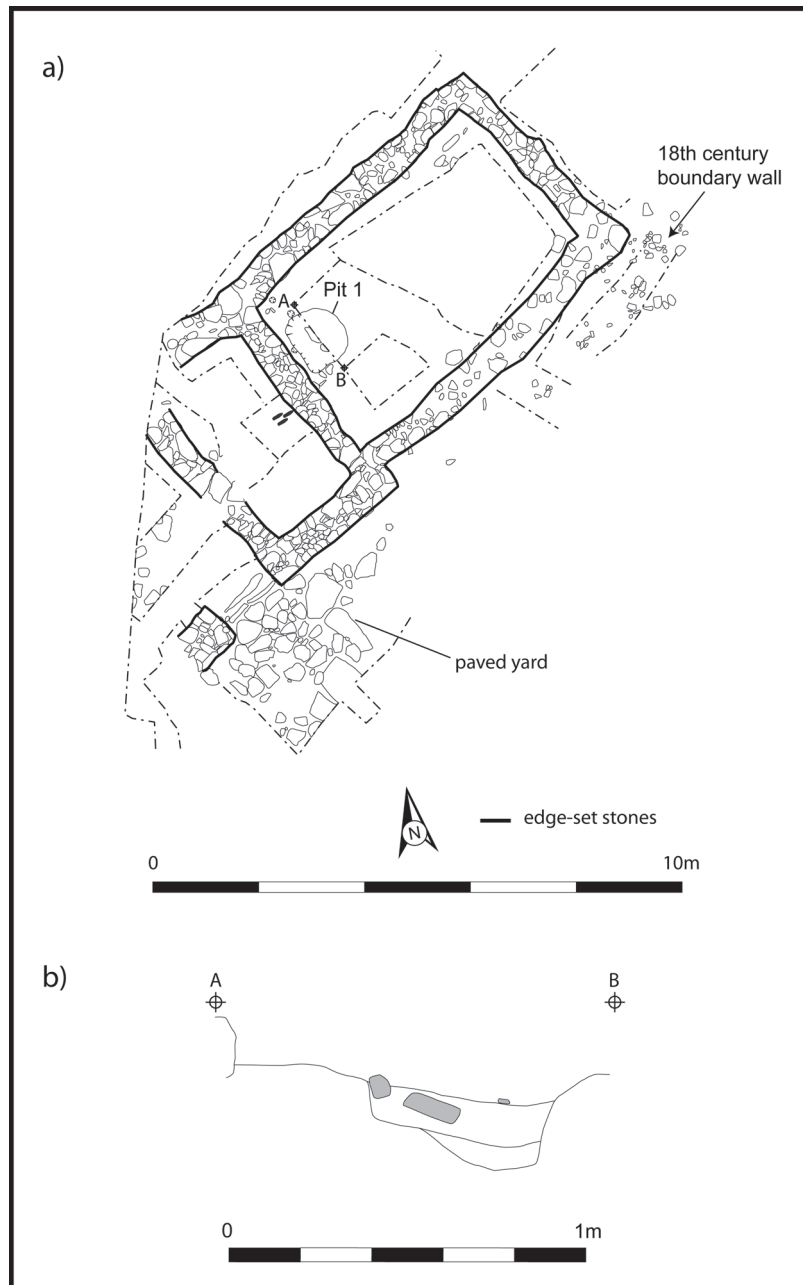
Structures 1 and HA1 were the only buildings uncovered at Eldbotle with internal drains. In both cases, two stone-lined drains crossed the

width of the structures. The similarity in design suggests that these drains served a similar function. Drains of this type were also observed in the 14th-century phases at Springwood Park (Dixon 1998: 746–7).

STRUCTURE 3 (ILLUS 6)

Structure 3 was located to the south-west of Structures 1 and 2 and consisted of a three-bay building with a paved yard area. The long axis of the building lay on the same north-east/south-west axis as the majority of structures found during the excavation. The structure was not fully revealed but the exposed remains measured at least 12m × 5m and stood to a maximum height of 0.5m. The room at the north-east end had been backfilled with stone rubble, possibly derived from either tumble or stone clearance. The quantity of stones within and surrounding the structural remains suggests that the walls of this building may have been significantly higher than has survived. There was no visible entrance into the room, although this may be due to later stone robbing. No evidence for cruck frame construction was observed (as was seen in Structures 6 and 8, see below) so it is possible that the walls supported the roof of the structure.

Beneath the stone rubble lay a brown, organic, clayey sand, 0.07m thick, which contained charcoal and small fragments of marine shell and animal bone. The absence of any artefactual material, combined with the highly fragmented nature of the ecofactual contents, suggests that this deposit represents post-abandonment build-up rather than deliberate disposal of midden. Beneath it lay a red sandy clay, interpreted as a floor layer, from which a single jug fragment of SWGW and small amounts of marine shell and animal bone were recovered. The clay floor had been cut by a sub-circular pit, just in front of the southern wall (illus 6; Pit 1). The pit, which was 1.0m in diameter, contained two fills (illus 6b). Both fills contained small unidentifiable fragments of animal bone, charred cereal grains



ILLUS 6 (a) Structure 3; (b) Section through Pit 1

consisting mainly of wheat, barley and some oat, and a small quantity of fuel ash slag, all suggestive of hearth debris. The upper fill also contained a number of artefacts, including an awl (illus 22; SF 170) that was presumably used for leather work. The form of such artefacts does not change much from the medieval period onwards and there are examples from Norwich and London dated to both the medieval and post-medieval periods (Goodall 1993a: 189; Egan 2005: 13, 149–50). A single sherd of SWGW and a possible gaming piece or counter made of volcanic stone (not illus; SF 175) were also recovered from this fill. Three stake-holes located around the pit are possibly associated with its function.

A trench excavated longitudinally along the middle of the central room revealed a sequence of deposits similar to those found in the north-east room. These consisted of an uppermost layer of clayey sand (post-abandonment build-up), which overlay a red brown sand with clayey lenses (the disturbed remains of a floor surface?), which, in turn, lay over the remains of a flagged floor. This lay over a dark-brown clayey sand, which is probably levelling material as it varied in depth across the building because the subsoil sloped down to the north-west at this point. The trench also contained three flat stones that had been set on edge into the subsoil. Similar sized stones set into the natural subsoil were also recorded in Structures 6 and 8 (see below). In Structure 6 a flagged floor lay over the edge-set stones so that, in effect, they created a void below the floor which could have acted as a sump or drain. It is possible that the edge-set stones had the same function within Structure 3, particularly given the presence of the flagged floor debris in the surrounding area.

A gap in the south-west wall of the central room may have provided access into the south-west room, but it was not clearly defined and could be the result of wall collapse or robbing. The main entrance into the building lay on the south-east face and in front of this were

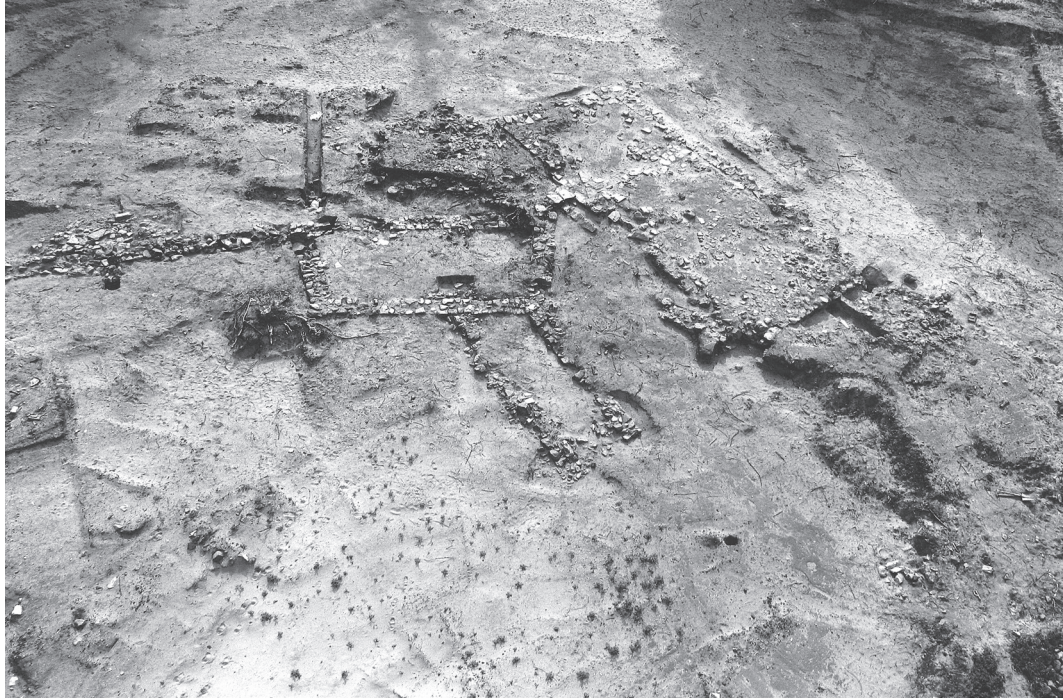
the remains of a roughly paved area or yard, constructed from a single layer of large and irregular, flat unworked stones and covering an area of approximately 4.0m × 2.5m (illus 6). This paved area lay directly over the subsoil and was buried by wind-blown sand.

A radiocarbon date from a fragment of animal bone from the basal levelling deposit in the structure suggests a *terminus post quem* for its deposition of between cal AD 1300 and cal AD 1440 (GU-17203).

STRUCTURE 4 (ILLUS 7)

This stone-built structure was aligned north/south and was thus the only one that did not respect the north-east/south-west alignment observed everywhere else on the site. It also differed from the other structures on the site in that it was more irregular in plan; while the main building was a regular width of 4.6m, the west wall was 8.4m long and the east wall was 7.2m long, making it slightly trapezoidal in plan. The irregular plan may have arisen because the structure appears to have been built onto the side of an existing boundary wall, E5. E5 consisted of two lengths of walling joined at right angles and built of large blue-grey rounded boulders. The west wall of Structure 4 continues the alignment of the north/south wall of E5, abutting the remains with a flush end rather than being tied into the earlier wall. The east/west wall of E5 has been incorporated into Structure 4 as its south wall. The new parts of the building, the west, north and east walls, had been constructed from clay-bonded, sub-rectangular stone.

A possible entrance way has been created in the south-west corner by the removal of a segment of the east/west wall of E5. A roughly paved floor was found within the structure. At some point, an extension had been constructed on the eastern side of the building, its north-east/south-west alignment conforming to that of the other structures excavated over the site. No dating evidence was found relating to the



ILLUS 7 Aerial view of Structures 4 and 5, looking west. (Copyright © Lothian Imaging)

construction and use of this building. However, its physical relationship with Structure 5 makes it clear that it must have preceded the latter – which lies over the Phase 5 wind-blown sand which buried Structure 4.

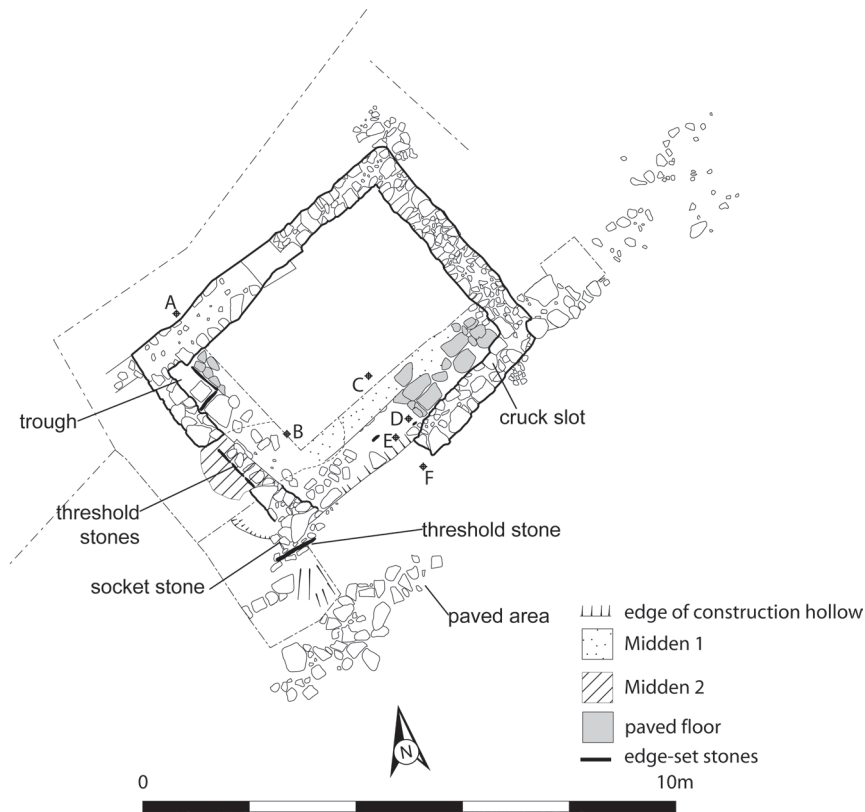
The position of Structure 4 on the corner of an enclosure into which it had direct access, together with the possible remnants of a flagged floor, suggest that this building may have had an agricultural use, such as a barn or byre. The odd alignment of Structure 4, in comparison with all the other structures in the settlement, may be because, as a barn or byre, it was looking out towards the fields.

STRUCTURE 6 (ILLUS 8–11)

Structure 6 consisted of a clay-bonded stone building with its long axis aligned north-east/south-west. The exposed remains measured 6.8m × 5m with walls 0.6m thick. The full extent

of only one room was uncovered but it was clear that further remains of the building extended into the south-west baulk. The exposed room measured 4.5m × 3.0m internally. The remains had been subjected to later stone robbing; part of the south-east wall and internal flooring had been removed.

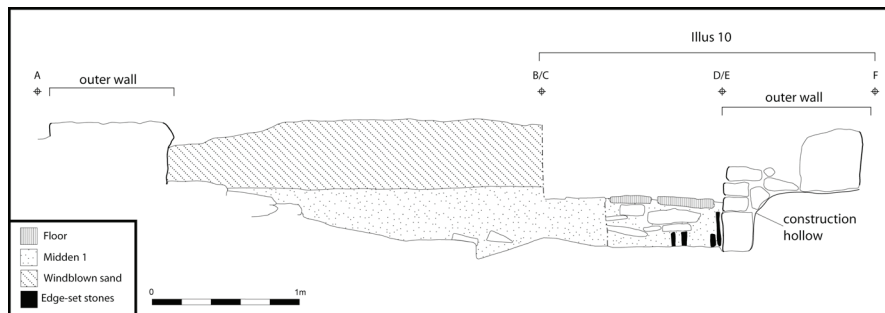
Structure 6 had been built within a hollow dug into the subsoil (illus 8 & 9). The outer face of the external wall was built directly on the subsoil around the edge of this hollow, with the bottom course built from large rounded stones. The inner face was built directly onto the base of the hollow using smaller, more angular stones. The wall survived to a height of up to 0.9m from the base of the hollow. In the base of the hollow, small angular stones had been set on edge into the natural in a similar manner to those found in Structure 3 (illus 8–10). The remains of a paved floor were supported on these stones, thus creating a void below the floor into which



ILLUS 8 Structure 6

domestic waste could presumably percolate through, into the underlying gravels. There were up to three layers of stone slabs above the edge-set stones, suggesting that the floor had been

frequently renewed. Although these slabs were limited to the undisturbed area of the building, the presence of small upright stones in the base of the disturbed area (illus 10) indicates that this



ILLUS 9 Composite section through Structure 6



ILLUS 10 Part of composite section through Structure 6, showing several layers of flagged flooring within the walls. The edge-set stones over which this floor was laid are visible in the foreground, just to the left of the ranging rod

stone flooring did, at one time, extend beyond these limits.

Towards the eastern end of the south wall was tentative evidence for the use of cruck frame construction. This consisted of a regular, rectangular gap (illus 11) in the masonry in which the lowermost course could have served as a post pad setting for one half of a cruck frame. However, there was no evidence for a matching post pad in the opposite wall. A stone-lined trough was located in the north-west corner of the room so it seems likely that this room had been used as a byre.

No external access to this room was seen – although robbing of the south-east wall may have removed any such evidence. However, access to this room was probably through the south-west dividing wall where a threshold stone was still in situ. External access to the whole building was through the south-west wall; this was represented by a large, flat, edge-set stone creating a raised threshold at the junction of the excavated room and the adjoining room. A displaced socket stone for a door post was found just behind the threshold stone (illus 8). This arrangement implies that both animals and

people shared a common entrance. The external entrance led out onto the remains of a paved area on the south side of the building.

A deposit of dark grey sandy silt covered the slab floor and filled the void below the stones (illus 9; Midden 1); it was also found across the base of the room where the slab floor had been removed. A small amount of late SWGW was recovered from this deposit as well as a large quantity of cereal grain, fish and animal bone. The cereal consisted mostly of barley remains, with a lesser quantity of bread wheat present. Also present in significant quantities were field peas (*Vicia pisum sativum* L). Bones of cod, haddock and plaice were present, as well as limpet and periwinkle shells. Faunal remains include cattle, sheep and an unfused horse bone. As the animal bones were quite large and relatively complete, it is thought that this deposit was not derived from human occupation but

from the dumping of domestic waste following abandonment of the building. This hypothesis is supported by the relatively low phosphate levels obtained from this deposit which suggests that human or animal influence during the formation of Midden 1 was minimal.

Sealing Midden 1 was another dumped deposit, Midden 2, rich in marine shell, predominantly limpets and periwinkles, and charred cereal grains, predominantly barley, with some wheat and oats. This deposit spread through the access way into the north-east room of the building. The weighted mean of 16 radiocarbon dates from marine shells and cereal grains from Midden 2 provide a *terminus post quem* for the abandonment of Structure 6 of cal AD 1410–1445 (illus 4 & Table 1; Weighted Mean 2), so it was probably in use during the 14th century. The building was eventually buried below wind-blown sand from which a fragment of a



ILLUS 11 Southern wall of Structure 6 showing possible cruck blade setting at eastern end



ILLUS 12 Structure 7 looking north-east

horse-shoe (illus 22; SF 111) was recovered. This horse shoe was a Type 4 shoe, dating from the 14th–15th centuries (Clark 2004: 88–9).

STRUCTURE 7 (ILLUS 12)

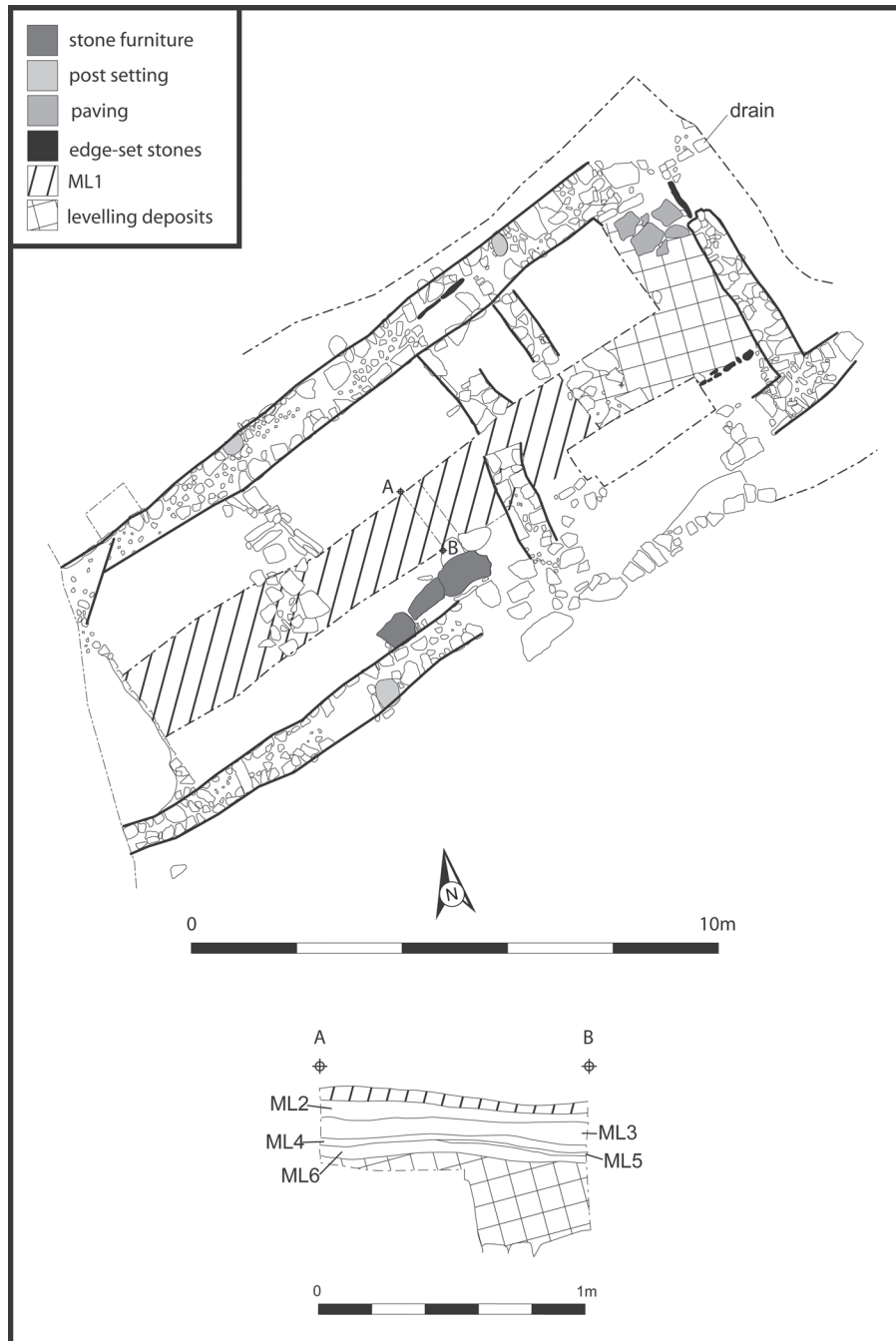
This structure consists of a rectangular spread of stone measuring 6.5m × 3m which was aligned north-east/south-west. The matrix of the stone spread contained frequent marine shells and animal bone suggesting dumping of the material. A spindle whorl made of limestone (illus 19; SF 6) was also found within the spread. A single course of a rubble-filled wall foundation, which ran parallel with the edge of the spread, was revealed in a small trench cut across the spread. The wall lay within a construction cut, the fill of which contained fragments of late SWGW, hence its inclusion within this phase. Although the trench was not big enough to fully define any building, it seems probable that, given its discrete shape and nature, the overlying rubble

spread represents collapsed rubble from a small building, the foundations of which are represented by the wall.

The truncated remains of a pit were found to the south of Structure 7 (illus 3; Pit 1). Although the pit was unexcavated, the remains of a shattered late SWGW pot (illus 16; no 4) were recovered from the exposed surface of this feature.

STRUCTURE 8 (ILLUS 13)

This building was the best preserved of all the excavated buildings. The exposed remains measured 13.2m × 5.3m with walls 0.65m thick, which survived up to 0.65m in height. The external walls had been constructed from large angular stones set in random courses with a clay bonding and a rubble core. Structure 8 was built into the eastern slope of Eldbotle Knowe, so the construction must have involved terracing. The full extents of three rooms were revealed with



ILLUS 13 Structure 8 with section through occupation deposits in the western room

a possible fourth room at the south-west end. A passageway separated the central and eastern rooms with external access at the northern end of the passage marked by a large edge-set flat slab forming a raised threshold. Stone robbing had removed the southern end of the passageway so it was not possible to determine whether there had also been a doorway on this side of the building. Access to the rooms on either side of the passageway was marked by gaps in the dividing walls. The eastern room also had an external opening in the north-east corner, marked by a raised threshold.

The eastern room appears to have been set on a lower terrace. Following the partial removal of wind-blown sand, a paved area of sandstone slabs were exposed lying over a surface of yellow-brown sandy clay. The densest concentration of the slabs lay in the northern corner of the room. In the south-east corner, a line of small, upright angular stones had been set into the sub-floor surface to a height of between 0.1m and 0.2m. These may be the remains of a raised flag floor similar to those found in Structures 3 and 6. However, no such stones were found below the slabs in the north-east corner.

A sequence of stratified deposits were found below the wind-blown sand within the western and central rooms. Excavation of a small slot trench through these deposits (illus 13b) recovered significant amounts of cereal grains, fish bone, marine shell and animal bone. The quantity of charred cereals present in the uppermost layer (ML1) was the largest found in any deposit on the site. It contained predominantly barley, with smaller amounts of wheat and oats; field peas and wild taxa were also present. The marine shell assemblage from this deposit was dominated by limpet and periwinkle shells, again in larger quantities than anywhere else on the site. In contrast, there were few fish remains and only cod and thornback ray were identified. Although there was a considerable amount of animal bone present, it was mostly unidentifiable because of

the small size of the fragments. Also recovered from this deposit was a wire loop fastener (illus 18; SF 163) made from a fine copper alloy wire. This type of fastener was used on clothing as well as on purses and is usually of late medieval date (Egan 2005: 26; Margeson 1993: 20).

Below ML1 was a light brown sandy silt, ML2. This also contained a substantial amount of cereal grains, although less than that retrieved from ML1, and in contrast, it was dominated by wheat with smaller amounts of oats, barley and field peas. Marine resources present included cod, haddock, limpet, periwinkle and Icelandic cyprine. A nail fragment (illus 21; SF 165), possibly a *spyking* similar to SF 164 (see below) was also recovered. ML3 was a red-brown sandy silt which contained relatively high quantities of cereal grains, dominated by barley with smaller amounts of wheat and oats. Marine foodstuffs included haddock, herring, limpet, periwinkle, cockle and mussel. Smaller amounts of cereal grain, primarily bread wheat followed by barley and oats, were recovered from ML4. There were also lesser amounts of marine species, although haddock, herring, limpet, periwinkle, cockle and mussels were present. Only marine remains were found in ML5 and ML6. The lowest deposit differed from others in the sequence in that it contained only a few small fragments of unidentifiable animal bone and it was significantly deeper; it is identical in appearance to the yellow-brown sandy clay seen under the paving stones in the northern corner of the eastern room and probably represents an initial levelling deposit over uneven subsoil. The abundant ecofactual material, combined with the occasional artefact in ML1–6, suggests that these deposits are midden, dumped after the abandonment of the structure and after the removal of all but a fragment of the paved floor. Perhaps midden was allowed to accumulate in abandoned buildings before being taken out onto the fields for manuring (see below).

The weighted mean of seven radiocarbon dates from marine shells and cereal grains from ML4 indicates activity sometime during the

14th and early 15th centuries (illus 4 & Table 1; Weighted Mean 1). The presence of the late medieval fastener, SF 163, also suggests activity post-dating the occupation of the structure. An almost complete iron sickle, SF 46 (illus 22), was also recovered from the surface of ML1. Sickles of this type seem to change little throughout the medieval and post-medieval periods (for other examples see Goodall 1977: illus 138; Goodall 1985: illus 5, no 55; Goodall 1993b: no 1426; Stewart & Stewart 1988: 313). A similar blade (illus 22; SF 174) was also found, but in an unstratified context.

The difference in the levels of these deposits between the two rooms highlights the terraced nature of the structure. Some sort of stone furniture was found within the central room, possibly a bench in the form of three flat stone slabs resting on flat slab uprights. Only the upper part of the feature was exposed because further removal of wind-blown sand was likely to result in its collapse.

Structure 8 displayed convincing evidence for cruck frame construction. Three post settings were built into the external face of the stone walls (illus 14). One setting formed an opposing pair but the matching setting for the other pair would have been located in a section of the south-eastern wall, which had been robbed out. A pad stone remained within the base of one of the settings (illus 14). Although no trace of the timbers was found, these post settings could have housed cruck frames. Additional evidence for the use of timber in the construction of Structure 8 was found in the form of SF 164, a medieval *spyking* used as a lath nail in joinery, which was recovered from the fill of one of these settings (Watt 2000: 140).

A linear alignment of stone running from the north-east corner of the structure into the baulk, where the beginnings of a parallel alignment of stone could be seen, was interpreted as a drain. The remains of Structure 8 were buried by a deposit of wind-blown sand.



ILLUS 14 Cruck blade setting in northern wall of Structure 8, with pad stone in base

THE PLAGGEN SOIL

The plaggen soil was encountered only in the southern part of the site (illus 3) and varied in depth from 0.17m to 0.75m, increasing in thickness as the ground sloped toward the east and south away from Eldbotle Knowe. The presence of so much bone and pottery suggests the use of domestic middens to manure and improve the nature of the soil for the production of cultivated crops. This manuring practice is also indicated by the enhanced phosphate levels obtained from samples taken throughout the soil profile in some of the test pits.

Significant amounts of SWGW (illus 16 & 17; nos 2 & 8) and animal bone were recovered from this soil. The animal bone consisted primarily of cow and sheep but fragments of dog, pig and horse bone were also recovered. A large proportion of animal bone could not be identified due to the small size of the fragments. Towards the south end of the site, to the south of E2, the plaggen soil increased in depth, suggesting that this area underwent a longer period of soil improvement. Three pieces of building ironwork were recovered from this soil where it overlay Structure 1. These included an incomplete stud with a round flattish head, SF 55a (not illus), and a badly corroded clench nail, SF 55b (not illus).

As the plaggen soil was only encountered in the southern part of the site, this suggests that these were the areas where cultivation was undertaken. It was also encountered in evaluation trenches to the south, but as no evaluation was undertaken beyond the eastern limits of the 17th fairway (see above), we do not know how far in that direction the soil extended. The limited exposure of this soil makes its precise phasing difficult in that it has very few relationships with the excavated structures. It is clear from its relationships with some of the enclosure walls (see below) that the soil must have developed over a long period of time because some of the walls lie within the soil, yet no clear boundaries denoting episodes of build-up were observed.

Pottery of 14th/15th-century date was recovered from this deposit.

PHASE 3B

This phase is defined by the dumping of material within several of the structures described above, marking their abandonment. Dumped material was observed in Structures HA1, 1 and 6. Within Structure HA1, this period of dumping was marked by successive deposits of wind-blown sand and domestic waste which contained various artefacts, the latest of which was an early 15th-century belt buckle. Structure 1 was buried below a possible midden deposit which contained large quantities of later SWGW. Radiocarbon dates from dumped material within Structure 6 suggest abandonment towards the end of the 15th century (illus 4).

While the abandonment of these structures may signal the beginning of the decline of the settlement, the anthropic material found in the dumped deposits and in the plaggen soil makes it clear that settlement continued, because rubbish was still being generated. Settlement may have continued in the Phase 3 structures that have evidence of dumping and possibly elsewhere outside the excavated area. The enclosure, E1, may belong to this phase (see below).

PHASE 4

This phase contains only features which are demonstrably later than the Phase 3 plaggen soil. These include the enclosure walls, E2, E3 and E4 which are discussed further below.

PHASE 5

All the structures and features discussed above were buried by wind-blown sand and although there were almost certainly many different

episodes of windblow, it has not been possible to define them because of the uniform nature of the sand. The sand contained medieval artefacts and SWGW, all of which is probably residual. The majority of non-ceramic finds from the sand came from the vicinity of Structure 8. These include domestic ironwork such as SF 42 (illus 19), a broken knife blade of a long-lived type that spanned the medieval and later periods, and SF 45 (illus 20), a handle for a wooden vessel, the shape of which is known from both medieval and post-medieval contexts (ie Goodall 1987: illus 156, no 52; Goodall 1985: illus 35, no 61; Goodall 2005: 394, illus 193; Moorhouse & Goodall 1971). Also recovered were SF 40 (illus 21), a possible binding strip and SF 44 (illus 21), an object which could be the remains of a file (cf Caldwell 1995: illus 81, no 101). Building ironwork consisted of stud heads SF 41 and SF 43 (not illus). Other finds from this deposit include a clench nail (not illus; SF 55) from the sand over Structure 2 and a possible fishing weight (not illus; SF 47) from the sand over Structure 4.

The example of Deposit 1 is discussed here to illustrate the difficulty of disentangling a phased sequence of events in an environment in which sand accumulation was probably a continuous process. This deposit lay within the enclosure (E2) and a slot trench excavated through it showed that it lay within a cut (only seen on its northern edge; see illus 3) and was at least 1.0m deep. Large amounts of SWGW were recovered from Deposit 1 together with a possible weeding or pruning hook (illus 21; SF 171). It also contained large amounts of carbonised cereal grains, primarily barley with some wheat and oats, and a small quantity of field peas. Animal bone (primarily sheep and cattle with some horse and pig), fish bone (haddock, cod and plaice) and shellfish (limpet, oyster and periwinkle) were also recovered. This is clearly a midden deposit, the pottery from which would date it to the late 14th–15th centuries and thus place it in Phase 3b. However, the pit (if we assume that this

is what the cut represents) was cut through wind-blown sand. This sand is either from a windblow predating Phase 3b or it is the Phase 5 windblow through which a later pit has been cut for the disposal of old rubbish lying around the settlement. The uniformity of the sand makes it impossible to determine which interpretation is correct.

PHASE 6

STRUCTURE 5 (ILLUS 7)

This structure is the only feature which is clearly later than the Phase 5 wind-blown sand. Despite being stratigraphically later in date, it was built on the same north-east/south-west alignment as the majority of the earlier structures. It was a large stone-built clay-bonded structure measuring 13.5m × 6.0m overall, with a single internal division creating a small room 5m long at the south-west end. The partial remains of a paved stone floor were located in patches throughout the building, lying over a stony yellow clay. The only possible point of entry was located in the centre of the south-west gable wall; this is unlike the other structures on the site which all had major doorways in the long walls. No dateable evidence was recovered from this structure. However, a folding knife with a scale antler handle (illus 19; SF 23) was recovered from the surface of one of the walls, but within an overlying disturbed deposit created by the construction of the modern motocross track. As such knives are rare in the archaeological record, their development is poorly understood, but they are thought to have become common in the post-medieval period (MacGregor 1985: 170). A similar, but larger, knife was found during the excavations of the Edinburgh Castle yard, together with a coin of 1760 thought to have been lost in 1810–50 (Holmes 1997: 169). Similarly, a George III halfpenny, dated to 1774 (not illus; SF 22), was also recovered from this disturbed deposit.

PHASE 7

By the 18th century, the settlement appears to have been abandoned and the land incorporated into the Archerfield Estate; the remains of a cemented boundary wall were found along the north-western edge of the settlement (illus 3 & 6). The area also appears to have been used to dump waste from Archerfield House; beneath wind-blown sand was a spread of stone rubble (illus 3) which contained much 18th–19th-century brown glazed earthenwares, a single fragment of German stoneware (illus 17; no 9), and glass from this period. Unstratified pottery which can also be placed in this phase includes imported wares such as North French Whiteware (illus 17; no 11) and a single fragment of North Italian Marbled Polychrome ware (illus 17; no 10).

In more recent times, a motocross track was constructed which ran across the central portion of the site. This track was constructed by bulldozing the soil and created much disturbance within this area. Finds from these disturbed deposits can be dated to the post-medieval period; these include an 18th-century bone knife handle (illus 19; SF 150), a strap hinge (illus 21; SF 149), and a suspension chain (illus 20; SF 148). This type of chain has a long chronology from the medieval period onwards. Well dated examples include those of 16th-century date from London and 16th–18th centuries from Norwich (Egan 2005: 97, no 437; Goodall 1993a: 141). A 14th-century example, with the remains of a vessel still attached, suggests that they were used for holding the cooking vessel over a fire (Egan 1998: illus 146; no 499).

ENCLOSURES (ILLUS 3)

Throughout the excavation, sections of possible enclosure walls were identified, often under other structures or appearing in test pits, particularly in the southern half of the

excavation area. The remains of at least four possible enclosures, E1–E4, were identified in this area. The problem in phasing the various enclosure walls is their relationship with the plaggen soil. As discussed above, it is clear that the soil had developed over a long period of time because some of the walls lie within the soil, yet no clear boundaries denoting episodes of build-up were observed. Some short sections of stone walls were definitely buried below the plaggen soil, for example, E6 (illus 3) and beneath Structure 5.

ENCLOSURE 1 (E1)

The poorly preserved remains of E1 were located at the southern end of the site, identified in a series of test pits (illus 3). Only a single course of large rounded boulders – with no apparent bonding material – survived (illus 15). The enclosure wall lay within the plaggen soil, indicating that it was built after the initial formation of the soil and, on the basis of the pottery contained within it, had probably fallen into disuse by the end of the 15th century, at the latest.

ENCLOSURE 2 (E2)

E2 is a large enclosure which would have measured approximately 40m × 50m. The walls consisted of random courses of large angular and rounded stones with clay bonding, with larger stones up to 0.5m × 0.6m at the base and smaller stones in the upper courses. This enclosure definitely post-dates Structure 8 as it lies over the north-west corner of that building. The south-western wall of E2 cuts the plaggen soil, so this enclosure must post-date Phase 3. E2 was in much better state of preservation than E1 (illus 15) and its position alongside E1 suggests that E2 may have been constructed to replace the former, which appears to have fallen into disrepair. The neglect of an enclosure wall suggests a contraction in settlement, while the construction of E2 signals reinvestment



ILLUS 15 Enclosure walls E1 to left and E2 to right

– and perhaps a revival in the fortunes of the settlement.

ENCLOSURES 3 & 4 (E3 & E4)

Within E2 are the remnants of other enclosures. The ‘L’-shaped remains of E3 appears to abut the north-eastern wall of E2, while another wall, E4, extends the southern wall of E3 to the west. E3 also cuts the plaggen soil. Fragments of late SWGW pottery were recovered from between the stones of E3, but it is possible that the pottery originated from the plaggen soil and became incorporated in the wall during building. E3 may be related to Structure 7; its southern wall lies parallel to the structure while its western wall is aligned on the western end of the structure.

Possibly associated with E3 were three gullies that lay parallel to each other and the southern wall of E3 (illus 3). They all had the same shallow curved profile and were filled with bright yellow sand, similar to the wind-blown sand. Gullies 1 and 2 did not appear to exist beyond the western wall of E3, although Gully 2 partially cut this wall. In contrast, Gully 3 ran along the side of the southern wall of E3 and continued alongside E4. Pit 2 had been dug down one side of E3; the pit contained numerous animal bones, including the articulated remains of a horse leg, and other food residues. A copper alloy pin (illus 18; SF 124) of a type which has a long chronology, from the medieval period to the 19th century, was also recovered from this pit (Biddle & Barclay 1990).

UN-PHASED STRUCTURES

STRUCTURE 2 (ILLUS 5)

Structure 2 lay at the very northern end of the site, overlying Structure 1. The remains of this structure comprised three stone walls of a building built on the dominant north-east/south-west alignment seen in the majority of structures within the settlement, although this structure was more northerly in its orientation. The northern end of the structure was missing. The south-west wall had been built directly over Drain 1 of Structure 1. A sondage dug through the centre of this building found no evidence of floor or occupation deposits and no dateable material was retrieved. A cobbled area abutting the outer face of the south-western wall may have provided a yard for the structure; the cobbles lay over the midden deposit, Midden 1, which had been dumped over Structure 1. The remains of a sickle blade (illus 22; SF 24) was recovered from the surface of the yard, as were pottery fragments of later SWGW (illus 16; no 3).

The absence of any dateable material or securely contexted artefacts makes the dating of this structure difficult. It must post-date Phase 3b because it cut Midden 1 which had been dumped over Structure 1. However, its relationship with the wind-blown sand is not clear; although surrounded by the sand, Structure 2 was not covered by it and lay directly under the topsoil. However, the structure was robustly built and has more in common with Structure 5 than it does with the other structures on the site. It is therefore possible that Structure 2 should be placed in Phase 6.

ELDBOTLE; STRUCTURAL ANALOGIES

Eldbotle is a valuable addition to a very small corpus of medieval rural settlements which have been excavated. At its peak, during the 13th and 14th centuries, the settlement consisted of at least eight buildings and associated enclosures

laid out on a broadly north-east/south-west alignment, along the inner edge of the dunes. The regular layout of the settlement, and the fact that it mirrored that of the earlier 9th–11th-century settlement, indicates a level of central planning, presumably by the landowner (see below).

The earlier settlement was characterised by earthfast timber buildings but by the 13th century, the community was building stone-footed structures. This seems to reflect a general trend in rural construction; at Springwood Park, Kelso, this change occurs in the 13th century (Dixon 1998: 742), while at Rattray, Aberdeenshire, it happens later in the 14th century, and there it was a change to clay walls (Murray & Murray 1993: 140–1). Although less regular in plan, the stone-footed structures at Eldbotle share many features with the Springwood buildings. They are typical longhouses, with byres at one end and living quarters at the other, and paved or cobbled yards outside. At Springwood, the houses were 8–13m long and 3.5–4.5m wide, while at Eldbotle they may have been slightly larger; Structure 3 was 12m × 5m while Structure 8 was 13.2m × 5.3m, but neither of these structures was fully uncovered. The best-preserved of the buildings at Rattray was up to 18m long (Murray & Murray 1993: 141), so we might anticipate a similar length for Structures 3 and 8. The evidence for entrances into the Eldbotle buildings was often obscured by later damage, but HA1, and possibly Structure 8, had opposed entrances in the long walls, a feature seen at both Springwood and Rattray. As at Springwood, no hearths were found in the excavated portions of the Eldbotle buildings, although hearth debris was abundant. The hearths may be located in the unexcavated portions, but it is also possible that braziers were used for cooking and heating, as has been suggested for Springwood (Dixon 1998: 747).

In buildings shared by both humans and animals, drainage would have been a major concern; and at Eldbotle an unusual and

innovative approach to drainage was taken in some of the buildings. HA1 and Structure 1 both had stone-lined drains crossing the width of the house, a feature also seen at Springwood (Dixon 1998: 746–7), but in Structures 6 and 8, and possibly also in Structure 3, the stone-flagged floor had been built over edge-set stones, creating a void below the floor into which waste could drain, and then percolate away into the sandy ground.

At Eldbotle, the later buildings all had clay-bonded stone foundations, but there is little evidence for the nature of the superstructure, except in Structures 6 and 8. The opposing post settings in the long walls of Structure 8 provide the clearest evidence for a cruckframe superstructure, while a rectangular gap in the masonry of one of the long walls in Structure 6 may also be a setting for a cruckframe. At Springwood, there was unequivocal evidence for the use of crucks in all the 13th–14th-century buildings with walls of clay over clay-bonded stone footings (Dixon 1998: 742–5), while in the best-preserved of the buildings at Rattray, two large carbonised oak timbers under a mass of burnt heather may represent the collapsed remnants of a cruck and the roof (Murray & Murray 1993: 142).

In the preceding discussion, comparisons have been made only with Springwood and Rattray because these remain the most fully excavated examples of Scottish medieval rural settlements. Recent excavations along the corridor of the A8 to the west of Edinburgh have uncovered evidence for medieval activity at Norton (Sneddon 2006a; Swan & Carruthers 2006), Gogar (Sneddon 2006b; 2007; James 2008; Morrison et al 2009) and Newbridge (Engl & Dunbar forthcoming), but none of the sites have produced comparable evidence for domestic structures and associated outbuildings. At Newbridge, the evidence comprised ditched field boundaries, pits, postholes and kilns, which has been interpreted as representing agricultural activity in the infields or ‘tofts’, the actual settlement lying some distance to the

north, while at Gogar, a similar array of ditches and pits have been interpreted in the same way.

Recent excavations at Halhill, Dunbar, have produced settlement evidence which is contemporary with the Phase 3 occupation at Eldbotle, but the structural remains are vestigial and difficult to interpret (Mitchell & Anderson 2011: 34). However, one of the structures consisted of a hollow dug into the ground and provides a possible parallel for Structure 6 (*ibid*: 7–10). It was smaller, shallower and less regular in plan than Structure 6, and may be vestigial remains of a similar structure, but it may also be that it had a different function; it has been suggested that the Halhill structure might have been a workshop (Mitchell & Anderson 2011: 31). Nonetheless, they demonstrate that sunken-floored construction was still current in the medieval period.

ELDBOTLE: TOWARDS AN ENVIRONMENTAL HISTORY

INTRODUCTION

Recent major advances in historical climatology (see, for example, Brázdil et al 2010; <http://www.euroclimhist.com/>) and environmental history have begun to transform our understanding of the anthropogenic and non-anthropogenic factors which shaped past human experiences and affected the social and cultural development of medieval Europe. Over the last two decades, research into the immediate dramatic impacts of extreme climate events and the more subtle changes of long-term climatic change, the epidemic and epizootic consequences of pathogens or the slow-burn effects of endemic disease, or the physical and psychological legacies of human agency, has given insight into the forces with which our ancestors interacted and delivered new understanding of the cultural and environmental practices and mechanisms – which together brought societal failure and

collapse or resilience and survival (see, for example, McGovern et al 1988; Redman & Kinzig 2003; Kinzig et al 2006; Dugmore et al 2007; Dugmore et al 2009). For medieval Scotland, these novel interdisciplinary methodologies have begun to shed light on areas that are lacking in the conventional materials from which to construct any form of historical narrative, principally on the lower tiers of rural society and the inner workings of rural communities. The new narratives are not conventional political constructs and nor do they enable us to give identities or voices to past populations, but they enable us instead to understand better how communities evolved and expanded or contracted; how they exploited the resources available to them, shaped the physical landscape around them, and responded to the opportunities and threats presented by climate change, weather events and the wider processes of environmental change (see, for example, Oram & Adderley 2010; Oram 2011b; Oram 2011c). When combined with the archaeological record, ephemeral or lost communities like Eldbotle can be brought back into daylight with a vibrancy and level of detail that no one form of data or discipline could otherwise produce. The following discussion provides an outline of what can be reconstructed from the surviving archaeological and historical record when combined with the wider palaeoenvironmental and proxy climate data.

THE CONTEXT OF SETTLEMENT EXPANSION

Eldbotle was already an old settlement by the time that it was first named in surviving documentary records (Morrison et al 2008: 21). Excavation has so far revealed two distinct episodes of occupation preceding the High Medieval settlement, dating from the early 5th to late 7th centuries, and from the early 9th to mid-11th centuries (ibid: 24–6). Phase 3, the main period of medieval occupation, commenced in the early 13th century and, in

the excavated areas, ended in the 15th century. The extent of settlement in the two excavated areas should probably be seen as indicative of the peak of population at Eldbotle in the century after *c* 1230. The north-eastern part of the settlement appears to have been abandoned by 1400, but activity continues in, or possibly moves to, the south-west for another half-century or so (although the earliest activity has only been observed in the north-eastern part of the site, it remains possible that early structures and deposits exist in the undisturbed strata beneath the buildings recorded by AOC and in the areas of unexcavated sand dunes or woodland surrounding the excavation areas). Two distinct phases, 4 and 5, appear to represent late medieval activity. Phase 4 may represent the reordering of a contracted community; no domestic structures were located and it was identified only as a distinct episode of enclosure construction or repair. Phase 5 is represented by wind-blown sand, contains residual 15th-century pottery, and may relate to a series of probable major erosion and windblow events extending down into the 1620s (discussed further below). Phase 6 should probably be identified with the continued agricultural activity on the site, which is recorded through the mid and later 17th century and continuing into the 1720s (NAS GD6/453, GD6/454, GD6/455, GD6/456, GD6/583). Phase 7 is associated with the abandonment of the site in the early 18th century, when the land was incorporated into the Archerfield Estate. By the time that General William Roy completed his mapped survey of this part of eastern Scotland in the early 1750s, although Eldbotle (labelled ‘Old Battle’) was apparently a still-extant settlement, no area of arable cultivation is shown associated with it (<http://geo.nls.uk/search/mosaic/> Scotland – Roy Lowlands – 1752–55). Indeed, Roy indicates that the whole of the district to the north, east and west of what appears to be a walled park at Archerfield House was open land, unexploited for intensive agricultural purposes (illus 23).

Although there appears to be a break of around two centuries between Phases 2 and 3, the existence of a settlement of some form at Eldbotle is attested by the issuing of charters there by kings David I and Malcolm IV, on at least two occasions between *c* 1124 and 1160 (Barrow 1960: no 194; Barrow 1980: Appendix A, no 1; Barrow 1999: nos 140, 141). Evidence for the structures present at that time may lie elsewhere in the unexcavated area. It is important to bear in mind this probable continuity of settlement around this north-western knuckle of East Lothian, for it points to a long history of pressure on available land resources prior to the main phase of development at Eldbotle in the 13th century. This is not good-quality land, even by the standards of the early medieval period, being made up chiefly of Class 4 or 5 soils, with the ideal agricultural Class 1 soil lying to the south of the site, towards Archerfield and Dirleton on the south-facing slopes. For there to have been agricultural activity here at times during the 5th to 11th centuries would indicate that the better-quality land to the south of Eldbotle was already being exploited intensively.

The context for Phase 3, which marks an intensification and expansion of settlement over the excavated area, and probably an increase in agricultural activity on the Class 4 and 5 soils to the north and west of the settlement, was perhaps the grant of the lands of Dirleton and Gullane to the first of the de Vaux lords, John I, in the late 12th century. John I, who was active between *c* 1159 and *c* 1190, and his descendants (active successively down to *c* 1260), appear to have dramatically increased economic activity and intensified resource exploitation on their properties, enabling them to begin construction of the impressive stone castle at Dirleton in the second half of the 13th century. There is no evidence which would allow us to claim that they pursued a deliberate policy of peasant colonisation and extension of agriculture, but the charter evidence – and the excavated evidence for Phase 3 – indicates that there was a step-change in activity at Eldbotle.

Within the wider south-east of Scotland from Teviotdale north through the Lammermuirs and into the Lothian plain, the late 12th and early 13th centuries witnessed a growth in population levels, spread of settlements, and expansion of the cultivated and grazed areas which can be recognised as a Scottish manifestation of the economic boom and its consequent demographic changes which swept across Europe after the end of the 11th century (Dyer 2002: chapters 4–6). A process of assarting – intakes made from land designated as ‘waste’ (ie uncultivated or otherwise unexploited) – saw major clearance of surviving areas of woodland along the edges of valleys feeding south into Tweeddale and Teviotdale, and north into the Lothian plain, as well as expansion into areas of lowland moorland and estuarine marsh (see eg Gilbert 1983; Fawcett & Oram 2004: 212–21; Fawcett & Oram 2005: 148–54; Oram 2011a: chapter 7). These processes were undertaken by a range of peasant speculators, operating with permission from lay and monastic landlords, and generally represented expansion from already existing settled areas. Within the northern part of East Lothian, however, it is unlikely that there were extensive areas of unexploited land ripe for settlement as late as the early 1200s, and the absence of reference to substantial areas of woodland or scrub in the country north of the Tyne could be taken as indicative of an already largely open landscape with extensive areas of open-field agriculture.

Eldbotle clearly experienced significant expansion of its settled area in the early 13th century and the charters recording grants of portions of property in the vill to the canons of Dryburgh indicate that the area of agriculturally exploited land was likewise expanding (Anon 1847: nos 104–7). As place-names like ‘Stanyacre’ (ibid: no 106) indicate, however, some of the ground that was being brought into cultivation before 1300 was poor quality and unlikely to have been a first choice for exploitation. Clearly, however, such poor quality land was deemed viable for farming

and capable of yielding returns that repaid the investment in time, labour and resources. The traditional interpretation of this assarting phenomenon – based chiefly on English evidence – is that population pressure was driving up the demand for grain, regardless of quality, giving landlords and peasant cultivators the opportunity to make substantial profits on the grain-market (Dyer 2002: 126–7, 129–31, 138–9; Postan 1972: Chap 2). This is a model which owes much to the interpretation of evidence for direct demesne cultivation by landlords, who were supposedly seeking to maximise their profits, heavily influenced by the economic experience of agricultural entrepreneurs during the Corn Law years of the early 19th century. With demand for grain rising, those with access to land and labour resources expanded their operations and made huge profits. Evidence for speculative expansion could – and has been – read into the physical evidence for extensive rig-and-furrow systems across the uplands of the Lammermuirs and northern Cheviots, taking advantage not only of an abundant supply of cheap young adult male labour, but also of the supposedly more benign climatic conditions prevailing in the 13th century (Parry 1975; Parry 1985). While there are major question marks over the dating assigned to much of this upland cultivation, with there being closely dated evidence from the northern Cheviots for an expansion of cultivation into these marginal zones in the early 16th century (Tipping 1998; Tipping 1999; Tipping 2004), more detailed modern knowledge of the climatic conditions and weather events affecting the whole of the North Atlantic region offer less positive alternative interpretations of this evidence.

In place of a traditional model of expansion simply driven by population growth and facilitated by climatic amelioration, more complex mechanisms can be suggested. The impetus for expansion probably did come from the more stable, warmer conditions experienced across northern Europe after 1000 and extending into the late 12th century,

but although population continued to climb substantially after 1200 – the English evidence suggesting that a peak was reached only in the early 1300s (Dyer 2002: 235, fig. 2) – the conditions in which that growth took place was deteriorating progressively and the rate of growth may have been levelling off in the closing decades of the 13th century. The crop failures recorded in the mid and late 13th century, presaging the catastrophic failures of the 14th century (Oram forthcoming), probably represent extreme instances in what was a pattern of progressively diminishing yields as weather and, very importantly, soil conditions deteriorated. In England, it is recognised that some expansion into marginal areas may have been driven by desperation as peasants sought to increase their acreage of crops to make up for shortfalls in yields (Dyer 2002: 231). The peak of activity at Eldbotle, where agricultural activity was extended into poor quality areas, may fall into this pattern.

STRUCTURES AND MATERIALS

The footprint of the settlement appears to have been quite substantial by the peak of Phase 3a. Although it cannot be stated with certainty that all eight of the structures associated with this phase were in use simultaneously – and two of them were probably byres or store-buildings rather than for human habitation – the extent of the unexcavated area at what appears to have been the core of the site gives a high expectation that there were more buildings. Indeed, reference to seven husbandlands in the much-contracted early 17th-century community (Anon 1835: 116) would imply that there is at least one further domestic building to be found and, more likely, several others. Although the lives of the people of Eldbotle were hard – and increasingly so as the 14th century progressed (Oram forthcoming) – they did not huddle in flimsy hovels; all of the probable houses and ancillary buildings were substantial constructions. A degree of planning

is suggested by the regularity in the alignment of the structures, which might be a legacy of the planned laying-out of the settlement in the 13th century by the de Vaux as part of the economic remodelling of their estate. While this is only speculation with regard to Eldbottle, planning by a superior authority does seem to have been a guiding influence in the development of the settlement excavated at Springwood Park, near Kelso, in the Borders (Dixon 1998: 740).

The structures at Eldbottle bear close comparison with the Springwood examples also in terms of individual plan. Most conform to a basic long-house form, with humans having accommodation in one end of a single, extended building, with their livestock housed in the other. The evidence from Structure HA1 pointed towards a use of stone dwarf walls as foundations for a turf-built superstructure, while the absence of post-pads or cruck-slots might imply that the roof structures may have been constructed on flimsier frames (Morrison et al 2008: 30). Of the six structures excavated by AOC, the walls were again principally stone-built, some employing clay-bonded field stone facing with rubble cores, but none showed definitive evidence for the turf superstructures proposed in HA1. Structure 1 had its clay-bonded outer skins constructed from field rubble but Structure 8's walls were constructed from large, angular blocks set in random courses. This material, different in character to that used in the other structures, coupled with the clear evidence in the same building for the use of crucks (see below), perhaps indicates that it was a higher status building constructed by a wealthier family. The use of angular stones also raises the possibility of material being obtained from quarry sources, Dryburgh having been given rights to take such stone from the lordly quarry at Gullane (Anon 1847: no 104). The quantities of rubble associated with the AOC buildings could indicate dumping of field-clearance in abandoned structures in the later Middle Ages but more probably indicates that the walls of the buildings had been significantly

higher than survived and there may have been stone gables used in some.

Two structures showed evidence of cruck-framing (Structure 8 and possibly Structure 6). The size of the settings within Structure 8 suggests that the cruck timbers would have been between 0.3m to 0.4m in diameter. Such substantial timbers would not have grown locally and must have come from preserves of wood elsewhere in the region. The limited use of cruck-framing on the site might also imply that it was an expensive technique, with the necessary materials being accessible by only some of the wealthier members of the community. That there was, perhaps, a substantial level of disposable income available to some families at Eldbottle in the 14th century might be borne out by the metalwork finds from the Headland excavations, which included spur straps, horseshoes and personal grooming implements (Morrison et al 2008: 38–8), interpreted as meaning that some of the inhabitants possessed riding-horses. Wealthy peasant freeholders are not unknown at other settlements in Scotland, perhaps best represented by the highly successful Gilbertson peasant dynasty at Buittle in Galloway, recorded in the later 14th-century estate rental of the Douglases of Dalkeith (Anon 1853: xlvi–lxxvi; Grant 1984: 67, 83). Some families were certainly able to profit from the crises which confronted medieval agricultural society after 1300.

In the other Phase 3 structures, the roofs were probably supported directly on the wall heads. This building style for the roofs probably reflects the limited range of materials available locally for exploitation by the peasant population in construction work. It also highlights another possible contributing factor to dune erosion, the stripping of turf for building and roofing material and the use of flimsier scrub-wood poles in the roof structures. In none of the structures was any evidence of the actual nature of the roofing materials identified, but there seems not to have been any use of tile, even for ridging or around smoke-holes. Permission to

take as much as was needed from the bents for roofing their buildings was amongst privileges granted to the canons of Dryburgh in the early 13th century (Anon. 1847: 104) and it is likely that this continued to be the main resource used for this purpose through the remainder of the settlement's history.

ARABLE AGRICULTURE

The archaeology at Eldbotle emphasises that Phase 3 witnessed both the peak and the beginning of the decline of the settlement. That much of this expansion was supported on an agricultural regime is evident from the documentary record as well as the excavated evidence. The 13th-century de Vaux charters refer to portions of the property in terms of 'territory' and 'acres', terms which, in the Middle Ages, signify the cultivated land associated with a community and specifically to ploughed land (Anon 1847: nos 104–7). The first of these charters awarded 20.5 acres to the canons and, significantly, included grazing for up to 12 oxen. This number was sufficient to draw one eight-ox plough and either contribute to another or provide draught animals for wagons or carts. Quantities of charred cereal grains were found in five of the structures, in varying mixtures of barley, bread wheat and oats. In Structures 6 and 8, field peas were also present. While the deposits containing these peas could not be dated any more precisely than 14th or early 15th century, there is documentary evidence from 1298 for peas forming a substantial component of the crop around Dirleton. In that year, it was reported that Bishop Bek's besieging force sustained itself by eating peas which they had taken from the fields in the neighbourhood of the castle (Riley 1865: 186; Rothwell 1957: 324–5). The grain, of course, could have been bought elsewhere and brought to the site for purposes like brewing – Haddington was a significant grain-market in the later Middle Ages – but the seigneurial monopoly over the processing and milling of grain through their possession of mills

and the obligation on their tenants to have all of their grain ground there (so-called *thirlage*), with a proportion paid to the lord and his miller (*multure*), makes this an unlikely situation. That grain was being grown and harvested at Eldbotle down to the 14th century, however, appears to be confirmed by the discovery of two iron hand sickles for cutting cereal stalks (illus 22) (Morrison et al 2008: 37). On the basis of the relative proportions recovered during the excavations, the main grain species grown was barley, followed by wheat, and with oats the most poorly represented. This directly contradicts the documentary record of the crops grown at Eldbotle in the 16th century and early 17th centuries, the latter of which expressly states that no wheat was grown anywhere around the settlement by the 1620s, and throughout the period oats was grown in significantly higher proportions than barley (Anon 1835: 110–16; Anon 1847: 333). The contrary evidence perhaps signifies differences in the processing of the various grains, or to distinction between crops grown for consumption and those grown for payment of rents or sale. Given the quality of the land, it is unlikely that the wheat was grown in Eldbotle's own fields and may have been bought in by wealthier farmers, but it should also be remembered that in 1458, legislation was passed by parliament stipulating minimum quantities of various commodities – including wheat – which were to be grown on Scottish baronies in an effort to boost food production and end reliance on foreign imports (RPS 1458/3/29). Wheat may have been grown at Eldbotle for a time, perhaps on the better-quality soils to the south of the settlement, including on the anthrosols which were identified in the AOC excavation.

This area of anthrosol, or 'plaggen soil', was discovered towards the south and east of the area excavated by AOC. It reveals efforts to improve the quality of the soil in an intensively cultivated area. Such anthrosols are the product of massive inputs of largely organic material to enrich and deepen the

soil (Davidson & Simpson 1994: 66–7, 73). Analysis of anthrosols around a number of Scottish medieval burghs, for example, Lauder, Wigtown and Nairn, suggest that most of this heavy manuring process was concentrated on former property backlands and in the infield portion of the former burgh rigs, and that material input included everything from human and animal dung to shambles waste, hearth sweepings and other organic domestic refuse. Analysis of deepened soils and documentary records from locations as widely dispersed as Shetland, Moray, Aberdeenshire and Galloway suggest that another major material being dug into the ‘plaggen’ was turf stripped from neighbouring grassland and mosses (Davidson & Simpson 1994). Such an activity at Eldbotle may have been a contributory factor to the increased evidence for build-up of wind-blown sand on parts of the site in the 14th century, if turf were being removed from the dune areas to the north and west. It is unclear how extensive the area of the anthrosols was, but it is unlikely to represent anything more than localised build-up associated with the garden plots of crofts and tofts of the husbandmen of Eldbotle. The excavation of a 14th-century midden abutting Structure 1, represented by a layer of dark brown sandy silt containing significant amounts of organic debris – fishbones and cereal grains – and with a heightened phosphate level, points to the process by which much of the materials used in the enrichment of the anthrosols was accumulated.

MARINE RESOURCES: BOOM AND BUST?

The presence of bones from several fish species in the midden deposits illustrates the exploitation of the local marine resources by a segment of the population. The quantities of species represented shows that this was a significant contributor to the settlement’s economy and the diet of its people, but documentary evidence for an active fisher presence in the community is slight and relatively early. The initial grant of

property in the barony of Dirleton to the canons of Dryburgh had been of the island of Fidra with at least one boat, and the payment of teind associated with that boat – a sure indication that it was involved in fishing – was the subject of a dispute between the canons and the nuns of the Cistercian priory at Berwick-upon-Tweed in the early 1200s (Anon 1847: nos 98, 192). The fishery in the Firth of Forth was of major importance to the economy of the region and is on record from the reign of David I (Barrow 1999: nos 134, 159, 213). Several monasteries had interests in the fishery, Dryburgh having further boats based at Anstruther and Kilrenny in the 13th and 14th centuries (Anon 1847: no 108). References to the fishery emphasise the importance of the herring catch, possibly principally for its value as an export commodity, once pickled in locally produced brine and barrelled. The value of the herring fishery was such that some monasteries were still seeking to gain access to it in the 14th century, as revealed in William de Candela’s grant to the monks of Balmerino of a site for a fishing-station at Anstruther, from which his son was receiving a rent of 100 herring for every barrel of fish caught by the monks’ men (Anon 1841: no 49). Demand for fish was high and Haddington again possessed an active market in that commodity.

Herring was not the only fish represented in the bone assemblage, with the main species represented being haddock, and with cod, pollack, whiting and others also present. The preponderance of haddock over herring might point to the latter being principally a cash catch sold inland. It is interesting to note that different techniques might have been employed in catching the different species, with the pelagic species generally being net-caught, and the others caught by baited lines. The latter was the technique favoured for haddock and mackerel caught elsewhere up the east coast of Scotland into the early 20th century. Ground for drying the herring nets was included in William de Candela’s grant to Balmerino. While no fish-hooks were discovered in the excavated area,

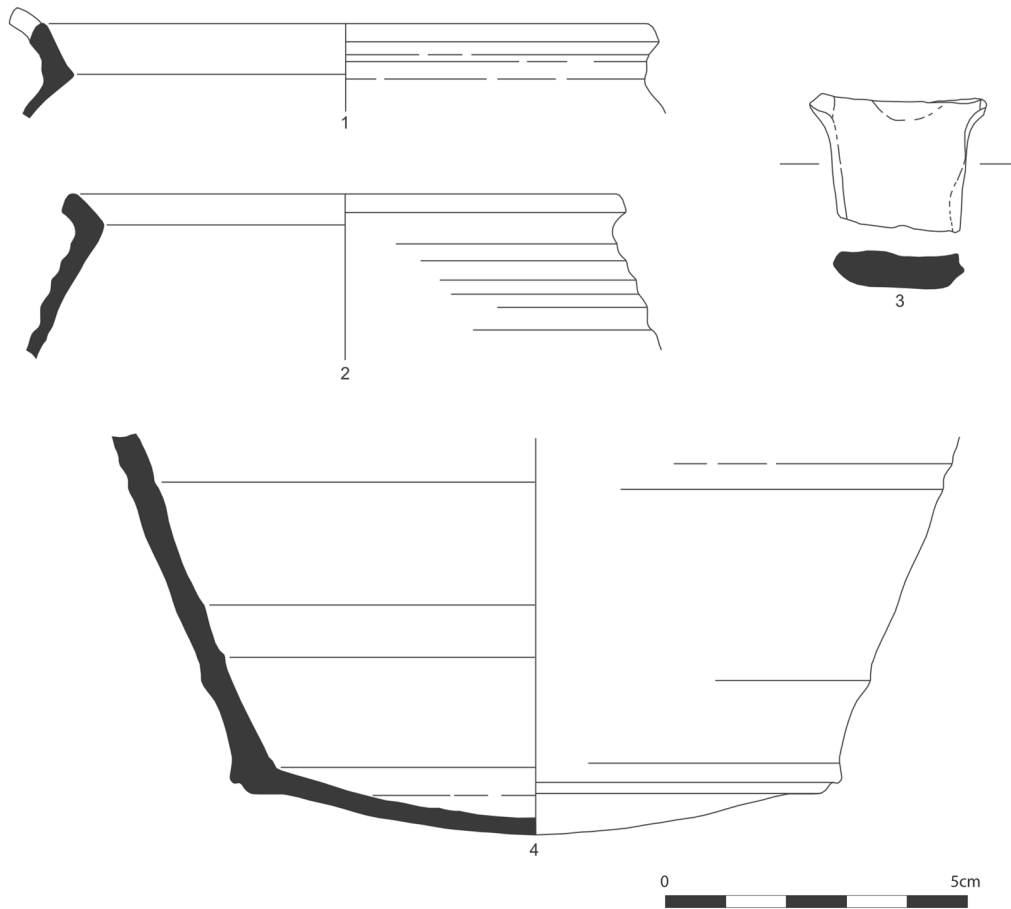
this might signify that the main processing of the fish and preparation of the nets and lines took place on the sea-side, away from the settlement. On the other hand, the quantities of shellfish remains recovered might indicate that baiting of lines was being done by hand at the settlement, if the mussels, winkles and limpets were not being consumed for food. The presence of these shells, however, might also be a further sign of the stress upon food production at Eldbotle during the crisis years of the 14th and 15th centuries. Limpets are not commonly consumed as part of the human diet, except at times of severe food shortages; they are commonly described as ‘famine foods’ during subsistence crises from the 17th to 19th centuries. Their inclusion in the midden debris might be an indication of the desperate straights of the people of Eldbotle as the famine hit hard.

CONTRACTION: CONTEXTS FOR DECLINE

How are we to interpret the contraction represented by Phase 3b? It is easy to be overly deterministic in reading environmental agency into this evidence, but the coincidence of the contraction of the settlement with the onset of one of the most profound episodes of climate change, epidemic and epizootic is too great to ignore. The repeated failures of the cereal crops which occurred in the first half of the 14th century, peaking between 1315 and 1322, affected all of Britain (Oram forthcoming). We have no hard figures for levels of mortality but it is generally suggested, on extrapolation from English and European accounts, that around 10% of the population may have died in those seven years (see Jordan 1996: *passim*). The survivors may have maintained the level of cultivation reached at the pre-1300 peak, simply to compensate for the ravages of the weather in the decades down to 1349, but probably the biggest shock to the community at Eldbotle was delivered with the arrival of the Black Death in that year. While we have no hard quantitative data for the level of mortality

which that event brought, the qualitative sources reviewed in Oram (Oram 2011c) indicate that something like one-third of the population perished between 1349 and 1351. This reduced population was given no opportunity to recover, for the second pandemic struck in 1362, the third in 1380 and the fourth in 1392. Mortality in the 1362 and 1380 outbreaks may have been close to the percentages lost in the first pandemic, but by 1392 the deaths seem to have been fewer – although still significant in number. The cumulative effect of these recurrences in England is reckoned to have reduced the population to less than 50% of its pre-1348 level (Dyer 2002: 235 fig 2) and it remained that low until the middle of the 16th century. If the experience of densely populated East Lothian was anywhere close to that scenario, the principal cause for the contraction experienced in Phase 3b appears self-evident.

Blows to the economy of Eldbotle, which would have had major implications for the viability of the community, affected more than the growing crops. Dryburgh’s principal interest in the vill was founded on sheep-farming, as it sought to capitalise on the booming price for wool on the European market in the late 12th and 13th centuries (Fawcett & Oram 2005: 152–3, 155). Wool production may have been a significant contributor to peasant livelihoods as well as to the abbey’s revenues; spindle whorls (illus 19) (Morrison et al 2008: 38) found in the excavations pointing to the manufacture of woollen yarn in Phase 3. This operation may have been damaged by the various epidemics of scab which afflicted the national flock in Scotland in the 13th and early 14th centuries, those in the early 1320s coinciding with the peak of the crisis affecting all aspects of European agriculture (Campbell 2010; Newfield 2009; Oram & Adderley 2010b: 262–3; Slavin 2010). Deaths, enforced slaughter of infected flocks and unsellable, befouled wool struck at a time when grain harvests were failing and the price of food was rocketing. Wool, which had provided a financial cushion and profits which

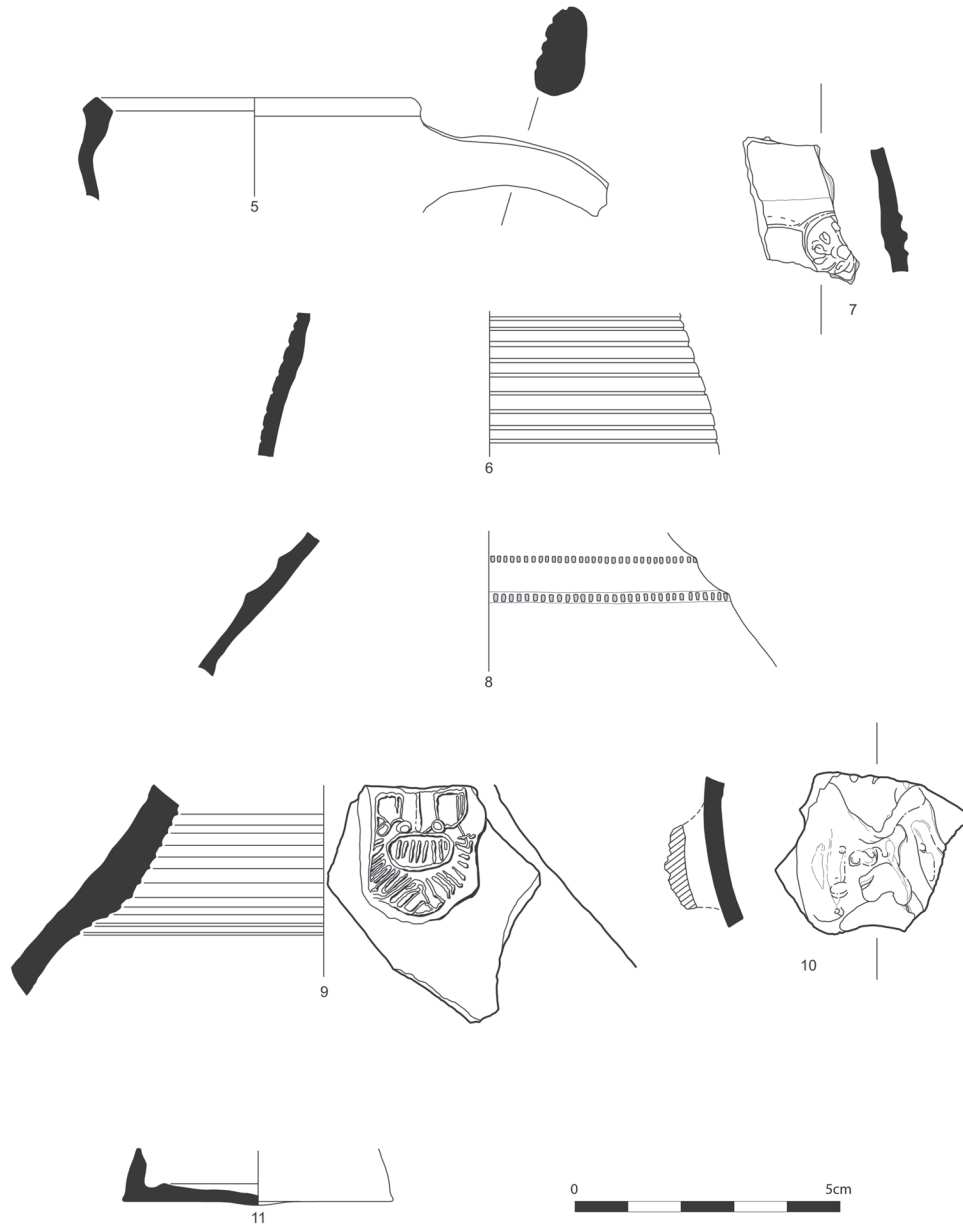


ILLUS 16 Scottish White Gritty Ware jars. (1) Rim and handle junction from jar with traces of external smoke blackening. (2) Rim from jar with traces of external smoke blackening. (3) Handle from jar with traces of external smoke blackening. (4) Base and side profile from jar with traces of external brown glaze

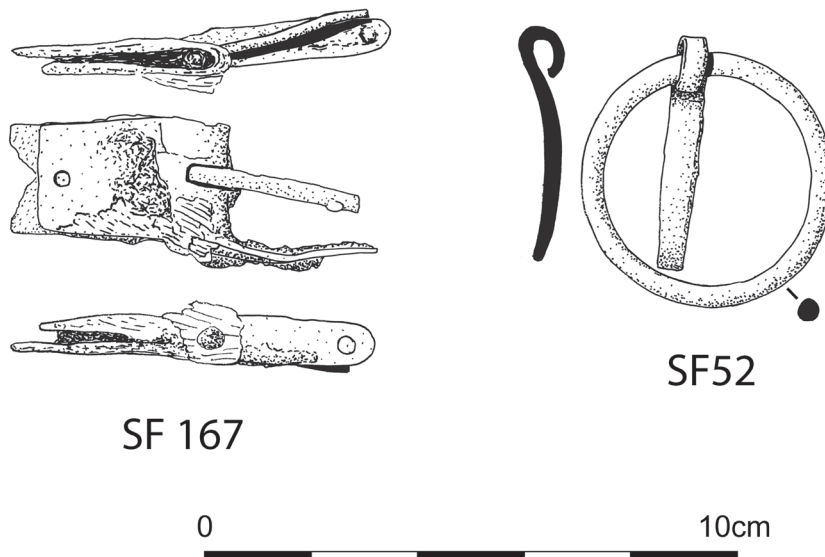
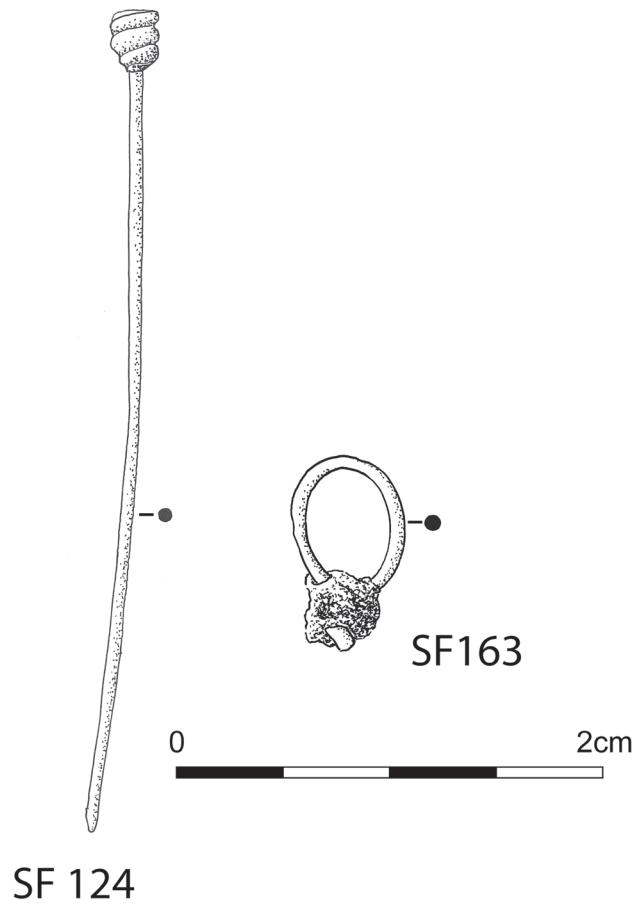
could be spent on luxuries in better times (as perhaps evidenced by the high-status goods and good-quality pottery recovered from the site (illus 16 & 17) (Morrison et al 2008: 33–9), had, perhaps, first been used to obtain essential foodstuffs on the market. The outbreak of scab ended that potential.

The age of the sheep represented by the bones found in the midden deposits might suggest that the animals were being kept for their meat and/or milk rather than their fleeces. Slaughter appears to have occurred at optimal

meat weight, which is normally interpreted as evidence that fleeces – which continue to be produced in volume in older animals – were not the primary consideration. This, however, could have an alternative significance if specialist wool-production was being pursued, with the softer fleeces of the first shearing being greatly in demand and carrying a higher price than the coarser wool of older sheep. Records from the eastern Lammermuirs show that flocks comprising entirely of hogs (two-year-old sheep) were being maintained and it is possible



ILLUS 17 Scottish White Gritty Ware jugs. (5) Rim and strap handle junction decorated with vertical incised lines. (6) Bodysherd from green glazed jug decorated with horizontal incised lines. (7) Bodysherd from green glazed jug decorated with brown glazed stamped decoration. (8) Bodysherds from green glazed jug decorated with horizontal notched cordons. (9) Frechen Stoneware: facemask from Bartmann jug glazed brown. (10) North Italian Marbled Polychrome: lug and bodysherd from Lion headed costrel glazed brown with white marbling. (11) North French Whiteware: basal angle from fine stoneware vessel



ILLUS 18 Copper alloy dress accessories. SF 124: copper alloy pin with wire wound round top of shaft. SF 163: wire loop fastener. Fine copper alloy wire (0.8mm diameter) twisted to form a slightly oval head (5.8 × 6.3mm); some ?mineralised material (perhaps textile) survives just below the loop. SF 167: copper alloy buckle with sheet plate and cast pin. Small rectangular buckle with flat and simple frame of convex sides, with holes at the site for the missing roller. SF 52: large, circular copper alloy buckle of single-loop frame cast pin

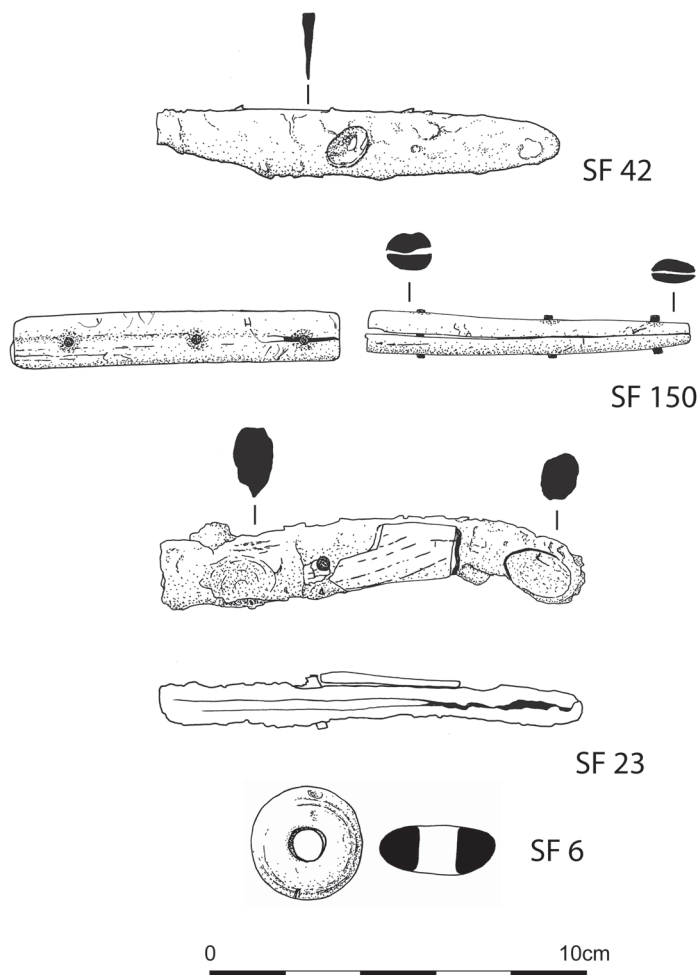
that Dryburgh was pursuing a similar strategy with its flock at Eldbotle. Given the significance which wool exports were to have for the Scottish economy in the second half of the 14th century (Grant 1984: 70–2, 236–7), it seems unlikely that the people of Eldbotle would not have sought to benefit from the product of their flocks, and would probably have rebuilt their livestock numbers as rapidly as possible after the outbreaks of scab.

Alongside the crop failures and sheep-scab epidemic there came a third catastrophe for peasant communities, the great cattle epizootic of 1318–25 (Newfield 2009; Campbell 2008; Campbell 2010). Again, we have no figures for the level of cattle mortality experienced in Scotland, but the work of Bruce Campbell and Tim Newfield suggests that, in some areas of England, as many as 80% of animals perished (Campbell 2008; Newfield 2009). The impact of such a level of mortality was crippling, for not only did it deprive the peasants of a further source of food – both from meat and from dairy products – but it also affected the supply of leather and hides which, alongside wool, was the major cash earner for many families. Furthermore, as Dryburgh’s exploitation of its land at Eldbotle reveals, bovines provided the principal tractor power in cultivation, a fact confirmed by skeletal evidence which revealed bone development attributable to yoking for traction. As accounts of the epizootic make clear, deaths amongst oxen were as high as amongst meat and dairy cows, depriving peasants of the means to cultivate their land. The identification of skeletal remains of old horses might point to the replacement of oxen by horses for traction in the wake of the cattle epizootic, but their specific dietary requirements made them expensive to maintain and Early Modern records from throughout Scotland indicate that oxen remained the primary draught animals beyond the medieval period.

Other factors, too, affected the livestock. There is a tendency to focus on the impact of

climate change on cereal cultivation but grass growth was also seriously affected by the same process. Recent studies of the effects of the colder and wetter conditions of the 14th century on upland and marginal grasslands in the western Highlands and Hebrides has pointed to a shortening of the growing season and a commensurate reduction in biomass production (Oram & Adderley 2008: 78–9; Oram & Adderley 2010a; Oram & Adderley 2010b). The result was a reduction of some 24% to 30% in the carrying capacity of the land, that is, in the level of stocking which it could sustain without suffering degradation. While this assessment is based on marginal upland and Hebridean locations and cannot be translated directly to a lowland east-coast target, it is likely that even the normally more moderate conditions of East Lothian suffered a similar kind of decline in growing season, biomass production and carrying capacity. On the poor quality grassland between Eldbotle and the coast, a reduction in the duration, quality and quantity of vegetation growth may have been more severe than in the richer pastures inland towards the Tyne valley. Regardless of the impact of the 14th-century epizootics, stock numbers would have had to fall as the grazing became less able to sustain the *souming* levels (the estimate of carrying-capacity of the land calculated in terms of heads of beasts) that had been set in the 12th and 13th centuries.

Attempts to maintain the traditional numbers of animals would have had consequences both for the grazing and for the condition of the flocks and herds. Over-grazing may have been a factor in the acceleration of dune erosion which seems to have begun in the 14th century (see below) as the stress on the vegetation began to see the breakdown of the root systems which bound the stabilising turf layer. Furthermore, the people of Eldbotle may have made heavy inroads into the bents in an effort to find additional fodder to sustain their animals. Despite their efforts, however, it is likely that the animals became undernourished. This



ILLUS 19 Knives and spindle whorl. SF 42: knife blade broken at the shoulder (different object to handle SF 150). Back and cutting edge tapering to round tip. SF 150: plain bone handle, consisting of two bone scale tangs riveted by three copper alloy rivets to an iron tang; the rivets go all the way through both scales. SF 23: folding knife with scale antler handle (only part of one scale survives) and at least two iron rivets. SF 6: spindle whorl of limestone (diam 29.5mm; height 13.5mm)

would not only manifest itself in loss of body mass and declining milk production but would also see a fall in fertility levels and an increase in foetus abortion. Added to this was the impact of the colder and wetter weather throughout the year, for the animals would have used a greater proportion of the calories which they consumed

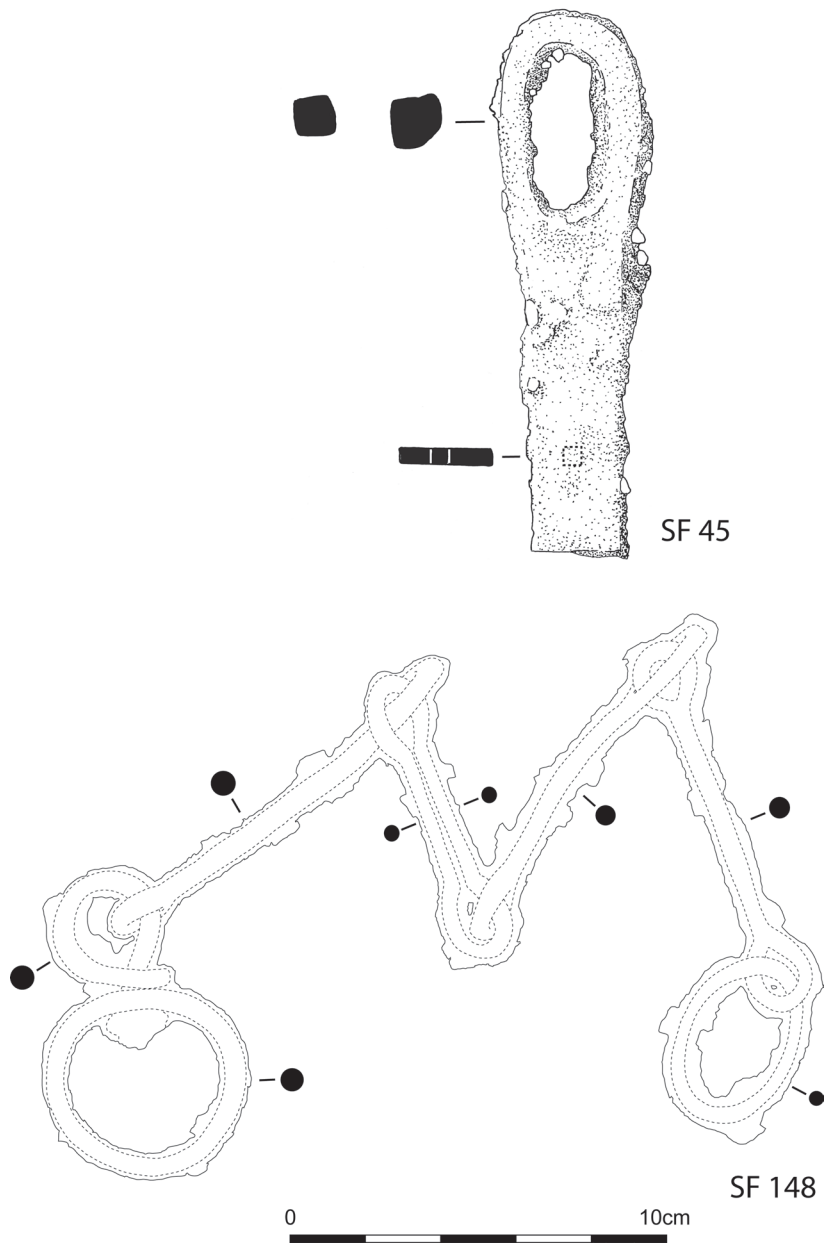
simply in maintaining body heat rather than it going to muscle growth and milk production. In short, the weather-related crisis of the early and mid-14th century, repeated and worsened in the bitterly cold years of the early 15th century (Oram forthcoming), affected pastoralists as severely as arable farmers.

DUNE EROSION

The dune systems which fringe the poorer grasslands to the north and west of Dirleton are ancient features but show evidence in their structure – and from the recorded history of the area – as having gone through episodes of extreme mobility. Destabilisation of the dune structures can result from a number of factors, chiefly involving the breakdown of the root systems of the grasses and gorse bushes which normally provide stability to the sand surfaces. Such a breakdown can result from a wide range of circumstances, natural and anthropogenic, but usually from a combination of both. Records from the first quarter of the 13th century mention that the vegetation on these links was already being exploited, and probably had been for several centuries beforehand. In a charter of before 1230, for example, the right to take material from the bents for roofing houses and other buildings was granted to the canons of Dryburgh by William de Vaux (Anon 1847: no 104). The same charter also gave them the rights to win fuel in the peatery of Dirleton and Eldbotle and building stone from the quarry of Gullane, rights which suggest that scrubwood fuel sources on the links-land were already facing exhaustion and that little adequate scrub-species growth was still available locally to furnish building materials. It is striking that so little evidence for the use of wood, either as a fuel or for construction, was found in any of the excavated structures (only small amounts of carbonised birch (*Betula* sp) (Morrison et al 2008: 26, Table 1) and a single fragment of oak (*Quercus* sp) were recovered, despite the sampling of the extensive midden deposits). All the enclosures were stone-built and there is no indication of the extensive use of fencing for boundaries between tofts, between tofts and the open fields, or to define the trackways and cattle-loans, which are regularly referred to in medieval documentation at other locations (Rogers 1879; Barrow 1999: no 225). This position stands in sharp contrast to the extensive

use of small diameter timber, revealed in accounts from the Gordon estates in the late 16th century, where birch, alder and hazel was being managed on an almost industrial scale to provide hundreds of thousands of poles and withies per annum (Ross forthcoming), or the management of similar scrubwood species to provide fence-poles etc on the Coupar Angus estate in the late 15th century (Rogers 1879, vol 1: 139, 170, 171, 172, etc). If the dune areas at Eldbotle were capable of supporting such species in the 14th and 15th centuries, there is no indication that the wood was being managed as a resource for building and, given the documentary evidence for the grazing of the area from at least the early 13th century, it is likely that early phases of clearance, followed by exploitation of the land for pasture, prevented significant regeneration. Where proxy evidence for wood in construction was found, in the cruck post-settings in Structures 6 and 8, it suggests that the timbers were of a size that would not have been supported on the dune area and were probably imported to the site.

The impact of intensive grazing on the links can be added to these processes. Cattle may have been the dominant livestock species present in the pre-12th-century agricultural community, but the identification of possible weaving implements in the Phase 2 settlement implies access to sources of wool – if not to the actual presence of sheep (Morrison et al 2008: 29). In the early 1200s, however, in addition to grazing rights for 10 cows and 12 oxen, William de Vaux gave Dryburgh the right to graze flocks of up to 300 sheep on the common pasture of the vill of Eldbotle and to construct a sheep-cote to house them (Anon 1847: no 104). It cannot be known what proportion of the *soum* of the grazing this number represented, but there is clear evidence from elsewhere in southern Scotland, in the late 12th and 13th century, for the size of flocks to be carefully limited and regulated to prevent damage to the grassland through over-grazing (Fawcett & Oram 2004: 222–3, 256–7). The example of the damage inflicted on the



ILLUS 20 Domestic ironwork. SF 45: handle support for wooden vessel. Corroded, but two nail-holes of square shape can be seen on the X-ray. SF 148: suspension chain with figure-of-eight links, a ring at one end and a pair of swivel rings at the other

common pasture at Hassendean, in the Borders, by the over-exploitation of grazing-rights there by the monks of Melrose, shows that grassland erosion was a very real problem (ibid: 256–7).

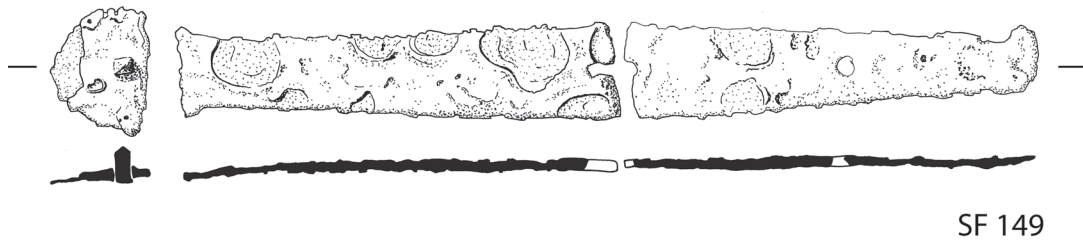
Cattle and sheep may not have been the only animals contributing to dune erosion. Reference in 1300 to the purchase of ferrets at Dirleton reveals the presence locally of a significant rabbit population (Watson 1998: 115). While there is no documentary reference to a managed warren anywhere on the lordship of Dirleton, it is likely that its de Vaux lords had brought rabbits to their property to be managed for meat and fur needs. This is a topic which needs to be explored in Scotland, for royal grants of land ‘in free warren’ point to the hunting of warrenable animals and their presence on a significant scale, while documented early placename forms of ‘cunningar’ or ‘coneygarth’ suggest the existence of formal structures for housing rabbits, probably identical to the better-known ‘pillow-mounds’ in England (Williamson 2006: 14–37). Escapees from managed pillow mounds quickly established colonies in sandy heath and dune areas; the Eldbotle dune systems would have provided an ideal location for such a colony. Burrowing rabbits can quickly expose the unstable sand layers below the turf in dunes and, once so exposed, the winnowing effect of the wind begins to undermine the turf layer, to create natural bunkers which expand rapidly along the line of prevailing wind direction.

Windblow is a significant feature of the natural stratigraphy of the dune areas, with former turf layers being exposed in areas of modern erosion, and is revealed clearly in sections as a laminated sequence of sand and black organic bands. The breadth of some of the sand layers suggests that there may have been extended phases of mobility before new vegetation layers bound the sand into place and turf again began to form. Lenses of clean sand within the organic layers point to shorter or more localised episodes of windblow; perhaps these represent short but extreme weather events. In the historical record,

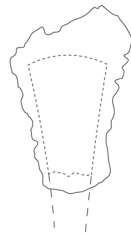
specific reference to problems of sand being spread south and east from the coastal region of Gullane Bay is relatively late. A report on the parish of Dirleton, produced in 1627, noted that the minister’s glebe in adjoining Gullane parish was ‘so overblown with sand as the largest aiker therof hes not bein manured these fyve yeiris bygone’ and that the estimate of value given to it by the assessors was unlikely to stand for long as ‘the samyne is licklie to be overblown more with sand’ (Anon 1835: 110, 115). The same report identifies seven husbandlands at Eldbotle itself at this time, of which three husbandlands and six acres held by James Lauder were described as being ‘two part ... waist being overblown with sand’ (ibid: 116). While these descriptions should perhaps be seen as consequences of the extreme weather events recorded in the first quarter of the 17th century, the archaeological evidence suggests that the overwhelming of the agricultural land at Eldbotle was not just a recent phenomenon. Structure HA1 had been abandoned before the end of the 14th century and its interior subsequently filled with dumps of domestic rubbish and wind-blown sand (Morrison et al 2008: 32). Again, the sequence of extreme weather events recorded through the 14th and 15th centuries provides some context for this process, with the major north-easterly gale of the winter of 1410 standing out as a key event (Oram in press).

WAR AND PLUNDER

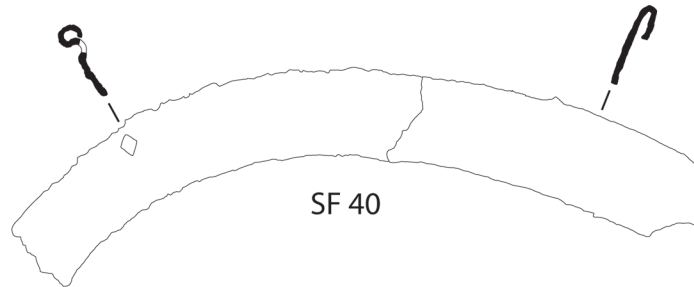
A final factor may have served as a critical trigger in tipping the economic viability of Eldbotle into crisis in the 14th century. At the point where the climate was beginning to slide inexorably into the cooling that established the pattern of extreme weather events that brought crop failure, grassland degradation and livestock deaths in its wake, the region was also experiencing the first episodes of the warfare which scarred it for much of the period down to the late 1310s and again for over a



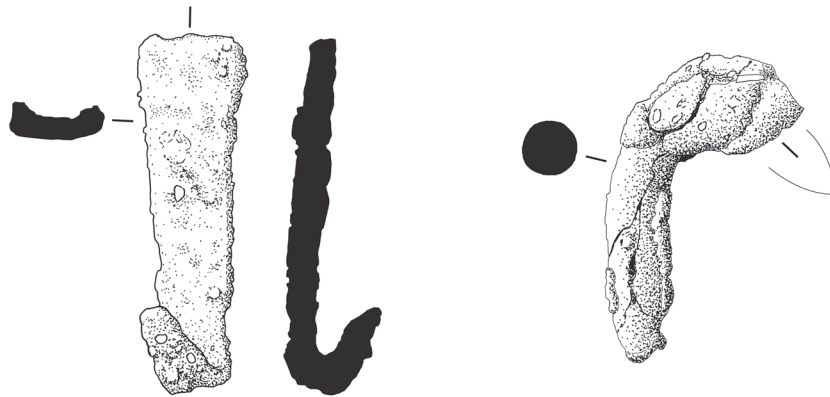
SF 149



SF 165



SF 40



SF 44

SF 171



ILLUS 21 Building and miscellaneous ironwork. SF 149: strap hinge, broken in three fragments; end loop to take the pivot is missing. SF 165: nail fragment. Corroded. Tapered without a true head, but with a thickening at the head end; flat top. SF 40: binding strip?, with edge folded over. Two fragments, one with an attachment nail-hole of square section. SF 44: possible tool. Rectangular section and tapering shape. SF 171: possible weedhook or pruning hook.

decade after 1334 (Barrow 1978; Nicholson 1965; Watson 1998: 65–6, 92, 115, 141). It is unlikely that Eldbotle escaped damage in the course of Bishop Bek's siege of Dirleton Castle in July 1298 (see above), when his starving army stripped the surrounding district of all foodstuffs and materials that could be found. The depredations of the English garrison in the early 1300s would have placed a heavy burden on an already stressed agricultural regime and the need to supplement the castle's supplies through purchases of grain at Berwick suggests that the local resources were already barely adequate for the needs of the farmers. Edward III's instructions to his commanders in southern Scotland in 1334–5 to systematically destroy the means of agricultural production on the lands of his enemies may have been just one more dimension in the complex interplay of anthropogenic and environmental factors which contributed to the progressive decline of Eldbotle in the years before the arrival of the Black Death.

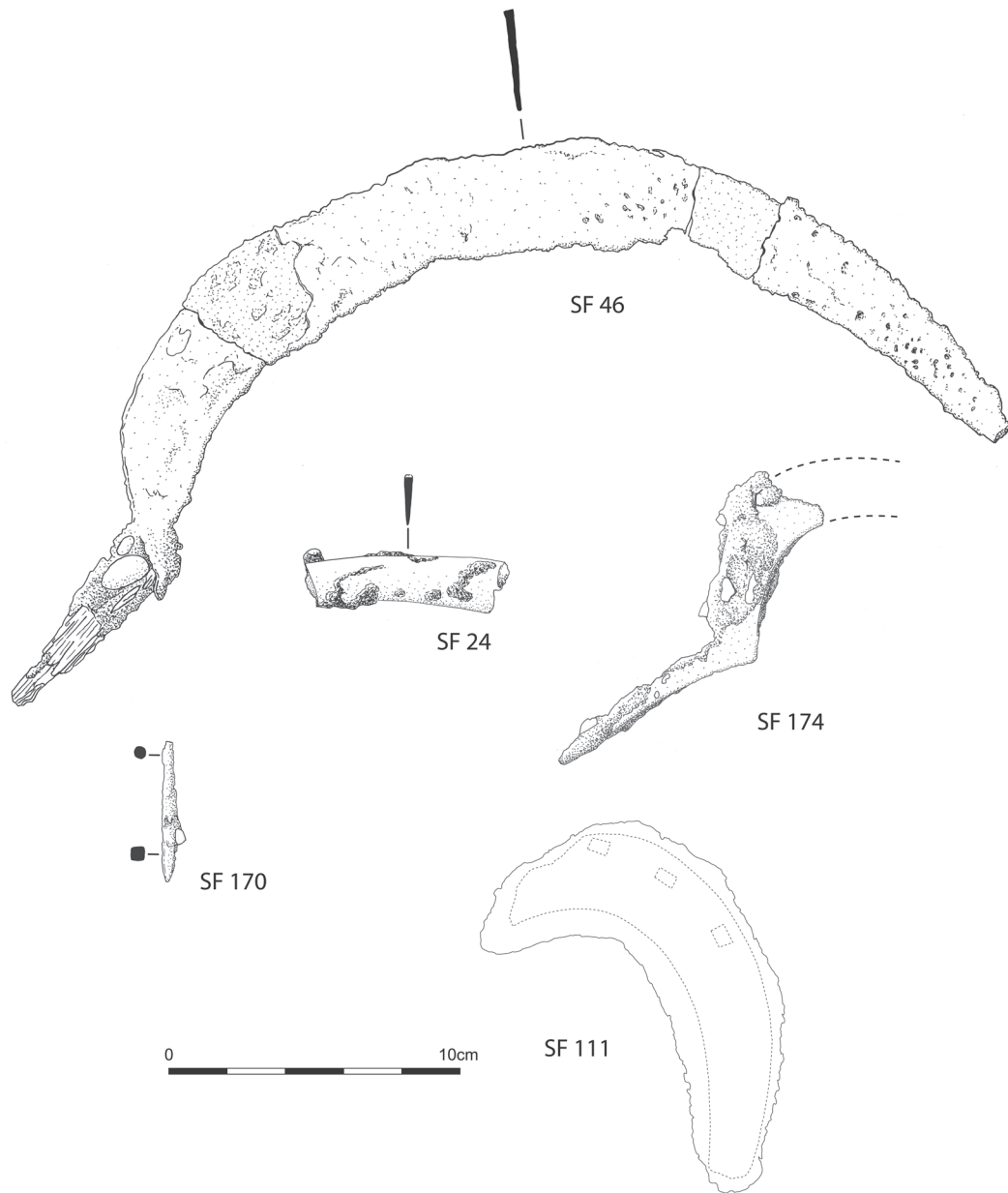
ELDBOTLE FROM THE 15TH TO 17TH CENTURIES

Although structural evidence for 15th century and later activity at the settlement site was limited to stone-built enclosure walls running into the excavated area, it is clear that the disease and weather-related impacts of the 14th and early 15th centuries did not end occupation at Eldbotle. Even though the documentary record for the 15th-century settlement is limited, the early 16th-century accounts demonstrate that it was still an economically viable unit and distinct area of settlement within the parish of Gullane and, from 1615, Dirleton (Oram & Oliver 2007: 3–4, 9–12, 13, 14–16 *passim*). It was, however, a minor component in a larger estate complex and the records from the mid-1500s and early 1600s indicate that it had become increasingly marginal. As discussed above, seven husbandland holdings were still occupied at Eldbotle in the 1620s, but two of

these had already been overwhelmed by sand. Wherever the dwellings and byres – and all the other structural paraphernalia of enclosures and cattle-loans which are mentioned in the contemporary documents – lay, it was not on the site of the medieval settlement. Clearly, there remains much to be discovered about this final phase in the community's history.

While the wind-blown sand which formed a significant layer of deposition over much of the Phase 3 and 4 structures could be used to provide a context for the progressive contraction of the settlement and its eventual abandonment, the wider environmental and human context offers a range of alternative scenarios. The chief factor to be borne in mind is that population levels had perhaps plummeted by as much as 60% by the end of the 14th century across Europe and showed little sign of recovery until after *c* 1550. In England, it may have been as late as 1750 before the population began to climb above pre-Black Death levels. If a similar demographic trend occurred in Scotland, with population being more than halved by famine, warfare, plague and other diseases before 1400, and with recurring epidemics and general food shortages keeping numbers depressed (Oram 2011c: 207–13), then there was no need to re-expand onto relatively marginal areas as the poor soils in the north and east part of Eldbotle represented. The contracted community may have been able to make a living from an acreage which could not have sustained the larger pre-1350 population in the reduced growing conditions of the time. Those poorer climatic conditions continued to deteriorate in the late 15th, 16th and early 17th centuries, further reducing the productive capacity of the property and, perhaps, exposing it to the increased threat of windblow.

Further episodes of disease may have taken their toll after the massive shocks of the first four plague epidemics. Certainly, the 1439 'wame ill' appears to have been catastrophic, if the claims of 30% mortality can be believed. Perhaps of more immediate concern was the influenza epidemic of 1432, which was noted as



ILLUS 22 Agricultural and other tools. SF 46: iron sickle. Broken into three fragments but complete, except for the wooden handle of which some mineralised material still remains. SF 24: sickle blade (two fragments), of parallel sides. SF 174: sickle fragment comprising part of the blade and whittle tang. SF 170: awl, incomplete. Square-sectioned tang and incomplete circular shank. SF 111: horseshoe fragment. Very corroded with no details visible except on X-ray, where simple rectangular nail-holes (not countersunk) can be seen



ILLUS 23 Extract from Roy's *Military Survey of Scotland 1747–55*; this depicts two buildings at 'OldBattle'

breaking out in nearby Haddington (Watt 1987: 277), a community with which the people of Eldbottle had, of necessity, significant contact. Likewise, the plagues of 1498–9 and 1548–9, both of which were centred on that burgh, may have brought fresh mortality to an already marginally viable settlement. Added to this last episode was the nature of the impact of the English armies that moved through the district in the period 1547–9 and that in 1548, followed a route along the coast which would have carried it over Eldbottle's lands (Merriman 2000: 314, 316–17). None of these events alone, however, ended settlement at Eldbottle. Despite the threat from windblow described in 1627, there were still a number of tenant farmers active on the land into the late 17th century. It was probably the new rationalism of estate-management

practice of that era rather than the harsh hand dealt to Eldbottle in the preceding centuries that drew its history to a close.

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REFERENCES

- Addyman, P & Goodall, I H 1979 'The Norman church and door at Stillingfleet, North Yorkshire', *Archaeologia* 106: 75–125.
- Anon 1835 *Reports on the State of Certain Parishes in Scotland, 1627*. Edinburgh: Maitland Club.
- Anon 1841 *Liber Sancte Marie de Balmorinach*. Edinburgh: Abbotsford Club.
- Anon 1847 *Liber S Marie de Dryburgh*. Edinburgh: Bannatyne Club.
- Anon 1853 *Registrum Honoris de Morton*. Edinburgh: Bannatyne Club.
- Bain, J (ed) 1884 *Calendar of documents relating to Scotland*, ii. Edinburgh.
- Bannatyne Club 1847 *Liber Sancte Marie de Dryburgh*.
- Barrow, G W S (ed) 1960 *Regesta Regum Scotorum*, i, *The Acts of Malcolm IV*. Edinburgh.
- Barrow, G W S 1978 'The aftermath of war: Scotland and England in the late thirteenth and early fourteenth century', *Transactions of the Royal Historical Society* 27: 103–26.
- Barrow, G W S 1980 *The Anglo-Norman Era in Scottish History*. Oxford.
- Barrow, G W S (ed) 1999 *The charters of King David I: the written acts of David I King of Scots, 1124-53 and of his son Henry Earl of Northumberland, 1139-52*. Woodbridge.
- Biddle, M & Barclay, K 1990 'Sewing pins and wire', in Biddle, M (ed) *Object and economy in Medieval Winchester*, 560–71. Winchester Studies 7ii.
- Brázdil, R, Dobrovolný, P, Luterbacher, J, Moberg, A, Pfister, C, Wheeler, D & Zorita, E 2010 'European climate of the past 500 years: new challenges for historical climatology', *Climate Change* 101: 7–40.
- Brooks, C M 1980 'Medieval pottery from the kiln site at Colstoun, East Lothian', *Proc Soc Antiq Scot* 110: 364–403.
- Caldwell, D H 1995 'Iron objects', in Lewis, J H & Ewart, G J 1995 *Jedburgh Abbey: The Archaeology and Architecture of a Border Abbey*, 91–3. Edinburgh: Society of Antiquaries of Scotland.
- Campbell, B M S 2008 *Nature as historical protagonist: The Tawney Memorial Lecture 2008*. <http://www.yada-yada.co.uk/podcasts/Blackwell/video/Tawney2008/index.html>
- Campbell, B M S 2010 'Physical shocks, biological hazards and human impacts: the crisis of the fourteenth century revisited', in Cavaciocchi, S (ed) *Economic and biological interactions in pre-industrial Europe from the 13th to the 18th centuries*, 13–32. Florence: University of Florence Press.
- Clark, J 2004 'Horseshoes', in Clark, J (ed) *The medieval horse and its equipment c 1150–c 1450*, 75–123. Woodbridge: Boydell Press.
- Cowan, I B, Mackay, P H R & Macquarrie, A (eds) 1983 *The Knights of St John of Jerusalem in Scotland*. Scottish History Society.
- Cowgill, J, de Neergaard, M & Griffiths, N 1987 *Medieval finds from excavations in London I: knives and scabbards*. London: HMSO.
- Davidson, D A & Simpson, I A 1994 'Soils and landscape history: case studies from the Northern Isles of Scotland', in Foster, S & Smout, T C *The history of soils and field systems*, 66–74. Aberdeen: Scottish Cultural Press.
- Dixon, P 1998 'A rural medieval settlement in Roxburghshire: excavations at Springwood Park, Kelso, 1985–6', *Proc Soc Antiq Scot* 128: 671–751.
- Dugmore, A, Keller, C & McGovern, T 2007 'Norse Greenland settlement: reflections on climate change, trade, and the contrasting fates of human settlements in the North Atlantic Islands', *Arctic Anthropology* 44.1: 12–36.
- Dugmore, A et al 2009 'Norse Greenland settlement and limits to production', in Adger, W N, Lorenzoni, I & O'Brien, K (eds) *Adapting to climate change: thresholds, values, governance*, 96–113. Cambridge: Cambridge University Press.
- Dulley, A J F 1967 'Excavations at Pevensey, Sussex 1962–66', *Medieval Archaeology* 11: 209–32.

- Dyer, C 2002 *Making a living in the Middle Ages: the people of Britain 850–1520*. London: Yale University Press.
- Egan, G & Pritchard, F 1991 *Dress Accessories c 1150–c 1450: medieval finds from excavations in London 3*. London: HMSO.
- Egan, G 1998 *The medieval household. Daily living c 1150–c 1450*. Medieval finds from excavations in London 6.
- Egan, G 2005 *Medieval culture in London in an age of transition*. London: MoLAS Monograph 19.
- Engl, R & Dunbar, L forthcoming 'A Roman road runs through it; excavations at Newbridge, Edinburgh'.
- Fawcett, R & Oram, R 2004 *Melrose Abbey*. Stroud: Tempus Publishing.
- Fawcett, R & Oram, R 2005 *Dryburgh Abbey*. Stroud: Tempus Publishing.
- Gilbert, J 1983 'The monastic record of a Border landscape 1136 to 1236', *Scottish Geographical Magazine* 99: 4–15.
- Goodall, I H 1977 'Iron objects', in Clark, H & Carter, A 1977 *Excavations in Kings Lynn 1963–1970*, 291–7. Society for Medieval Archaeology 7.
- Goodall, I H 1985 'Ironwork', in Cunningham, C M & Drury, P J *Post-medieval sites and their pottery: Moulsham Street, Chelmsford*, 51–7. CBA Research Report 54.
- Goodall, I H 1987 'Objects of iron', in Beresford, G 1987 *Goltho: the development of an early medieval manor c 850–1150*, 177–86. English Heritage Archaeol Rep 4.
- Goodall, I H 1993a 'Iron chains, links and chain fittings', in S Margeson, 140–1.
- Goodall, I H 1993b 'Iron horticulture and agricultural tools', in S Margeson, 193–5.
- Goodall, I H 2005 'Iron objects', in Biddle, M *Nonsuch Palace: the material culture of a noble restoration household*, 373–411. Oxford: Oxbow Books.
- Grant, A 1984 *Independence and nationhood: Scotland 1306–1469*. London: Edward Arnold.
- Haggarty, G forthcoming 'Ceramic material', in Gooder, J 'Excavations in the Canongate backlands, Edinburgh', *Scottish Archaeol Internet Reports*.
- Hall, D W 2007 'Excavations at the pottery production centre of Colstoun, East Lothian in 1939, 1969, 1971, 1977 and 1999/2000', *Medieval Ceramics* 28: 35–74.
- Holmes, N 1997 'The coins', in Driscoll, S T & Yeoman, P A 1997 *Excavations within Edinburgh Castle in 1988–91*, 168–71. Edinburgh: Society of Antiquaries of Scotland Monograph Series 12.
- Hope-Taylor, B 1980 'Balbridie ... and Doon Hill', *Current Archaeology* 72: 18–19.
- Hurst, J G, Neal, D S & van Beuningen, H J E 1986 'Pottery produced and traded in north-west Europe 1350–1650', *Rotterdam Papers* V1. Rotterdam.
- James, H 2008 'Edinburgh Tram Scheme – Gogar Church, City of Edinburgh (Edinburgh parish), excavation and preservation in situ', *Discovery Excav Scot* 9: 72.
- Jones, R, Haggarty, G, Hall, D W & Will, R 2006 'Sourcing Scottish White Gritty Ware', *Medieval Ceramics* 26 & 27: 45–84.
- Jordan, W C 1996 *The great famine: Northern Europe in the early fourteenth century*. Princeton: Princeton University Press.
- Kinzig, A P, Ryan, P, Etienne, M, Allison, H, Elmqvist, T & Walker, B H 2006 'Resilience and regime shifts: assessing cascading effects'. *Ecology and Society* 11.1: 20. [online: <http://ecologyandsociety.org/vol11/iss1/art20/>]
- MacGregor, A 1985 *Bone, antler, ivory and horn: the technology of skeletal materials since the Roman period*. London: Croom Helm.
- McGovern, T, Bigelow, G, Amorosi, T & Russell, D 1988 'Northern islands, human error and environmental degradation: a view of social and ecological change in the Medieval North Atlantic', *Human Ecology* 16.3: 225–70.
- Maidment, J (ed) 1830 *Abstract of charters and other papers recorded in the cartulary of Torphichen from 1581 to 1596*. Edinburgh.
- Margeson, S 1993 *Norwich households: the medieval and post medieval finds from Norwich survey excavations 1971–1978*. East Anglian Archaeology 58.
- Merriman, M 2000 *The Rough Wooings: Mary Queen of Scots 1542–1551*. East Linton: Tuckwell Press.
- Mitchell, S & Anderson, S 2011 'A rural medieval settlement and Early Iron Age funerary remains at Hallhill, Dunbar, East Lothian', *SAIR* 50.
- Moorhouse, S & Goodall, I, H 1971 'Iron', in Moorhouse, S 'Finds from Basing House, Hampshire (c 1540–1645): Part two', *Post-Med Archaeol* 5: 36–57.

- Morrison, J, Oram, R & Oliver, F 2008 'Ancient *Eldbotle* unearthed: archaeological and historical evidence for a long lost Medieval East Lothian Village', *East Lothian Antiquarian and Field Naturalists' Society* 27.
- Morrison, J, Oram, R & Ross, A 2009 'Gogar, archaeological and historical evidence for a lost medieval parish near Edinburgh' *Proc Soc Antiq Scot* 139: 229–55.
- Murray, H K & Murray, J C 1993 'Excavations at Rattray, Aberdeenshire. A Scottish deserted burgh', *Medieval Archaeology* 37: 109–218.
- NAS GD6 *Papers of the Brooke Family of Biel*.
- Newfield, T P 2009 'A cattle panzootic in early fourteenth-century Europe', *Agricultural History Review* 71.2: 155–90.
- Nicholson, R 1965 *Edward III and the Scots*. Oxford: Oxford University Press.
- Oram, R D 2011a *Domination and lordship: Scotland 1070–1230*. Edinburgh: Edinburgh University Press.
- Oram, R D 2011b 'Waste disposal and peri-urban agriculture in Early Modern Scotland c 1500–c 1800', *Agricultural History Review* 59.1: 1–17.
- Oram, R D 2011c 'Disease, death and the hereafter,' in Cowan, E J & Henderson, L (eds) *Handbook of Scottish Medieval History*, 196–225. Edinburgh: Edinburgh University Press.
- Oram, R D in press 'Estuarine environments and resource exploitation in eastern Scotland c 1125–c 1400: a comparative study of the Forth and Tay Estuaries', in Thoen, E & Vervaert, L (eds) *Landscapes or Seascales?* Turnhout: Brepols Publishers.
- Oram, R D forthcoming "'The worst disaster suffered by the people of Scotland in recorded history": climate change, dearth, pathogens and war in the long fourteenth century.'
- Oram, R D & Oliver, F 2007 *Eldbotle and Archerfield: an historical assessment*. Centre for Environmental History and Policy, University of Stirling. Unpublished report for Headland Archaeology.
- Oram, R D & Adderley, W P 2008 'Lordship and environmental change in central Highland Scotland c 1300 to c 1450', *Journal of the North Atlantic* 1: 74–84.
- Oram, R D & Adderley, W P 2010a 'Re Innse Gall: A Norse Colony in the Irish Sea and Hebrides?', in Imsen, S (ed) *The Norwegian domination and the Norse world c 1100–c 1400*, 125–48. Trondheim: Rostra.
- Oram, R D & Adderley, W P 2010b 'Lordship, land and environmental change in West Highland and Hebridean Scotland c 1300–c 1450', in Cavaciocchi, S (ed) *Economic and biological interactions in pre-industrial Europe from the 13th to the 18th centuries*, 257–68. Florence: University of Florence Press.
- Parry, M L 1975 'Secular climatic change and marginal agriculture', *Transactions of the Institute of British Geographers* 64: 5–11.
- Parry, M L 1985 'The impact of climatic variations on agricultural margins', in Kates, T W, Ausubel, J H & Berberian, M (eds) *Climate impact assessment*, 351–68. Chichester: John Wiley & Sons.
- Perry D R 2000 *Castle Park, Dunbar: Two thousand years on a fortified headland*. Edinburgh: Society of Antiquaries of Scotland.
- Proudfoot, E & Aliaga-Kelly, 1997 'Aspects of settlement and territorial arrangement in south-east Scotland', *Med Archaeol* 41: 33–50.
- Redman, C L, & Kinzig, A P 2003 'Resilience of past landscapes: resilience theory, society, and the *Longue Durée*', *Conservation Ecology* 7.1: 14. [online: <http://www.consecol.org/vol7/iss1/art14>]
- Riley, H T (ed) 1865 *Willelmi Rishanger, Chronica et Annales*. London: Rolls Series.
- Rogers, C A 1879 *Rental Book of the Cistercian Abbey of Cupar-Angus*. Vol 1. London: Grampian Club.
- Rothwell, H (ed) 1957 *The Chronicle of Walter of Guisborough*. Royal Historical Society, Camden 3rd series, London.
- RPS *The Records of the Parliaments of Scotland to 1707*, K M Brown et al eds (St Andrews, 2007–2013) 1458/3/29. [online: <http://www.rps.ac.uk>]
- Russell, N, Cook, G T, Ascough, P L & Dugmore, A J 2010 'Spatial variation in the marine radiocarbon reservoir effect throughout the Scottish post-Roman to late medieval period: North Sea values (500–1350 BP)', *Radiocarbon* 52: 2–3, 1166–81.
- Slavin, P 2010 'The fifth rider of the Apocalypse: The great cattle plague in England and Wales and its economic consequences, 1319–1350', in Cavaciocchi, S (ed) *Economic and biological interactions in pre-industrial Europe from the 13th to the 18th centuries*, 165–79. Florence: University of Florence Press.

- Sneddon, D 2006a 'Norton House Hotel', *Discovery Excav Scot* 7: 77.
- Sneddon, D 2006b 'Edinburgh Tram Scheme, Gogar, City of Edinburgh (Kirkliston parish), evaluation', *Discovery Excav Scot* 7: 76.
- Sneddon, D 2007 'Edinburgh Tram Scheme, City of Edinburgh (Edinburgh and Kirkliston parishes), evaluation', *Discovery Excav Scot* 8: 85.
- Stewart, J H & Stewart, M B, 1988 'A highland longhouse: Lianach, Balquidder, Perthshire', *Proc Soc Antiq Scot* 118: 301–17.
- Swan, D & Carruthers, M 2006 'Norton House Hotel', *Discovery Excav Scot* 7: 77.
- Tipping, R 1998 'Cereal cultivation on the Anglo-Scottish Border during the "Little Ice Age"', in Mills, C M & Coles, G (eds) *Life on the edge: human settlement in marginal areas*, 1–11. Oxford: Oxbow Books.
- Tipping, R 1999 'Towards an environmental history of the Bowmont Valley and the northern Cheviot Hills', *Landscape History* 20: 41–50.
- Tipping, R 2004 'Palaeoecology and political history: evaluating driving forces in historic landscape change in southern Scotland', in Whyte, I D & Winchester, A J L (eds) *Landscape and Environment in Upland Britain*, 11–20. Exeter: University of Exeter Press.
- Thomson, J M (ed) 1984 *Registrum Magni Sigilli Regum Scotorum, 1609–1620*. Edinburgh (reprint).
- Watson, F J 1998 *Under the Hammer: Edward I and Scotland, 1286–1306*. East Linton: Tuckwell Press.
- Watt, D E R (ed) 1987–9 Walter Bower, *Scotichronicon*. 9 vols. Edinburgh: Mercat Press.
- Watt, J G, 2000 'Iron nails', in Stamper, P A & Croft, R A *The south manor area. Wharram: a study of settlement on the Yorkshire Wolds, VIII*, 140–7. York Univ Archaeol Pub 10.
- Williamson, T 2006 *The archaeology of rabbit warrens*. Princes Risborough: Shire Publications.

MAPS

- Soil Survey of Scotland, 1976 *Land Use Capability, Haddington, Eyemouth and North Berwick*, Sheets 33, 34 and part of 7, 1 inch to 1 mile.
- Adair, J 1736 *A map of East Lothian*. <http://maps.nls.uk/counties/detail.cfm?id=202>
- Ainslie, J 1821 *Map of the southern part of Scotland*. <http://maps.nls.uk/joins/649.html>
- Blaeu 1654 *Lothian and Linlithgo*. <http://maps.nls.uk/atlas/blaeu/page.cfm?id=108>
- Forest, W 1802 *Map of Haddingtonshire*. <http://maps.nls.uk/joins/629.html>

WEBSITES

- Pfister, C and others <http://www.euroclimhist.com/> Euro-Climhist. A data-base on past weather and climate in Europe and its human dimension.

